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CHANGE

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

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1/18/80 H.H.

Cancellation Date: Retain

SUBJ: CHANGE TO AIR TRAFFIC CONTROL HANDBOOK

1. PURPOSE. This change transmits revised pages for the Air Traffic Control Handbook, Order 7110.65B and supersedes Appendix 3 to Order 7110.77A.

2. EXPLANATION OF CHANGES. The significant changes are highlighted below. If further information is desired, contact the office in parentheses.

a. 21. ABBREVIATIONS. Incorporates the provisions of Appendix 3 to Order 7110.77A. (AAT-330)

b. 26. RADIO COMMUNICATIONS TRANSFER. See a.

c. 45 - 52. ADDITIONAL SERVICES. Clarifies the intent to provide traffic advisories to all aircraft; requires that aircraft be advised when an altitude advisory is unverified, and provides a more logical order to the section. (AAT-320)

d. 56. EXCEPTIONS. See a.

e. 59. FIX USE. See a.

f. 74. AUTHORIZED RELAYS. See a.

g. 100. AIRWAYS AND ROUTES. See a.

h. 124. IFR FLIGHT PROGRESS DATA. Makes the Military Liaison and Security Officers responsible for developing procedures to ensure the accuracy of completeness of ALTRV control information. (AAT-330)

i. 231. EXCEPTIONS. See a.

j. 290. ROUTE USE. See a.

k. 291. UNCONTROLLED AIRSPACE. See a.

l. 297. DEGREE DISTANCE ROUTE DEFINITION USAF/USN. See a.

m. 300. IFR MILITARY TRAINING ROUTES. See a.

n. 702. TRANSFER OF RADAR IDENTIFICATION METHODS. Corrects an inaccuracy and removes an erroneous requirement. (AAT-320)

Distribution: ZAT-710 (A11) **Initiated By:** AAT-420

o. 723. CONFLICT ALERT. Restricts the application of the group suppression message to military aircraft which are engaged in special types of military operations. (AAT-330)

p. 950. ARRESTING SYSTEM OPERATION. Provides exceptions to the requirement to initiate crash alarm procedures after a USAF/USN preplanned practice barrier/cable engagement. (AAT-320)

q. 1052. RUNWAY LIGHTS. Revises the procedures for the operation of runway edge lights. (AAT-320)

r. 1211. POSITION ADVISORIES. Standardizes the use of the word "course" by a PAR controller when advising an aircraft of its position with respect to the final approach course. (AAT-320)

s. 1508. IFR MILITARY TRAINING ROUTES. See a.

t. 1520 - 1522. SEA LANE OPERATIONS. Incorporates for national application sea lane operational procedures which were heretofore contained in waivers. (AAT-320)

3. EFFECTIVE DATE. This change is effective April 1, 1980.

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RICHARD L. FAILOR
Director, Air Traffic Service

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Chapter 1. INTRODUCTION

Section 1. TERMS OF REFERENCE

1. WORD MEANINGS

As used in this manual:

a. *"Shall,"* or an action verb in the imperative sense, means a procedure is mandatory.

1a. Examples.—

"Issue an alternative clearance."

"Authorize the aircraft to taxi."

"The transferring controller *shall forward* these data to the receiving controller."

"Do not clear an aircraft to land or take-off from a closed runway."

b. *"Should"* means a procedure in recommended.

c. *"May"* or *"need not"* means a procedure is optional.

d. *"Will"* means futurity, not a requirement for application of a procedure.

e. Singular words include the plural.

f. Plural words include the singular.

g. *"Aircraft"* means the airframe, crew members, or both.

h. *"Approved separation"* means separation in accordance with the applicable minima in this manual.

i. *"Altitude"* means altitude mean sea level, flight level, or both.

j. *"Miles"* means nautical miles unless otherwise specified, and means statue miles in conjunction with visibility.

k. *"Course," "Bearing," "Heading,"* and *"Wind Direction"* information shall always be magnetic unless specifically stated otherwise.

l. *"Time"* when used in the context of a clock reading is the hour in Greenwich Mean Time (GMT) or the local equivalent, as appropriate, and the minutes. Change to the next minute is made at the minute plus 30 seconds except time checks are given to the nearest quarter minute.

2. NOTES

Statements of fact, of a prefatory or explanatory nature relating to directive material, are set forth as notes.

3. ANNOTATIONS

Revised, reprinted, or new pages are marked as follows:

a. The change number and effective date are printed on each revised or additional page.

b. Arrows in the margin of the text mark the location of substantive procedural, operational, or policy changes; i.e., when material affecting the performance of duty is added, revised or deleted. The accompanying Change Notice will contain the intent of the change. A reprinted page not requiring change is reproduced in its original form.

c. "Editorial Change" at the bottom of the page indicates that revisions have been made that do not change the intent of the text or affect performance of duty; e.g., changes in wording, numbering of paragraphs or pages. This notation will not appear where editorial/substantive changes are on the same page.

d. A new paragraph inserted between existing paragraphs, will be numbered by using the number of the preceding paragraph followed by a dash (—) and a number. The new paragraph will have an independent title, and is not subordinate to the preceding paragraph. This

numbering procedure is used only when renumbering existing paragraphs is not feasible and a reserve paragraph is not available.

e. Paragraphs/sections annotated with *"EN ROUTE"* or *"TERMINAL"* are only to be applied by the designated type facility. When they are not so designated, the paragraphs/sections apply to both type (en route and terminal) facilities.

f. The annotation, *"USAF"* for U.S. Air Force, *"USN"* for U.S. Navy, and *"USA"* for U.S. Army, denotes that the procedure immediately following applies only to the service designated.

3.f. Reference.—Military Procedures, 14.

4. RECOMMENDATIONS FOR PROCEDURAL CHANGES

a. Controllers should submit recommended changes in procedures directly to their area COPCOM member or alternate member.

b. Recommendations from other sources should be submitted through appropriate FAA, military, or industry/user channels to Headquarters, FAA: Director, Air Traffic Service (Attn: AAT-300).

5-9. RESERVED

Section 2. APPLICATION OF AIR TRAFFIC CONTROL SERVICE

10. ATC SERVICE

Provide air traffic control service in accordance with the procedures and minima in this handbook except when:

a. Deviation is necessary to conform with ICAO Documents, National Rules of the Air, or special agreements where the United States provides air traffic control service in airspace outside the United States and its possessions.

10.a. **Note.**—Pilots are required to abide by FARs or other applicable regulations regardless of the application of any procedure or minima in this handbook.

b. Other procedures/minima are prescribed in a Letter of Agreement, an FAA or military document.

10.b. **Note.**—These procedures may include altitude reservations, air refueling, and fighter interceptor operations.

10.b. **Reference.**—Procedural Letters of Agreement, 12.

11. CONSTRAINT GOVERNING PROCEDURAL DEVIATIONS

Exceptional or unusual requirements may dictate local procedural deviations from the provisions of this handbook. Prior to implementing any deviation from ATC procedures, obtain approval from the appropriate headquarters. Approval authorities are:

U.S. Navy:	CNO (OP-513)
U.S. Air Force:	AFXOOTF
U.S. Army:	Director, USAATCA—Aeronautical Services Office (CCQ-ASO-AT), Cameron Station, Alexandria, Virginia 22314
FAA:	Director, Air Traffic Service

11. **Note.**—*TERMINAL:* Headquarters USAF has delegated to major air commands authority to authorize base commanders to reduce same runway separation standards for military aircraft. These are specified and approved by affected ATC and user units. When applied, appropriate advisories may be required; e.g., "(Ident) continue straight ahead on right side; F-16 landing behind on left." "(Ident) hold position on right side; F-5 behind on left."

12. PROCEDURAL LETTERS OF AGREEMENT

Procedures/minima which are applied jointly or otherwise require the cooperation or concurrence of more than one facility/organization must be documented in a Letter of Agreement. Letters of Agreement only supplement this handbook. Any minima they specify must not be less than that specified herein unless appropriate military authority has authorized application of reduced separation between military aircraft.

12. **Reference.**—7210.3—430, Letters of Agreement.

13. USE OF MARSA

MARSA may only be applied to special military operations specified in a Letter of Agreement or other appropriate FAA or military document.

13. **Note.**—Application of MARSA is a military command prerogative. It will not be invoked indiscriminately by individual units or pilots. It will be used only for special IFR operations requiring its use. Commands authorizing MARSA will ensure that its implementation and terms of use are documented and coordinated with the control agency having jurisdiction over the area in which the operations are conducted. Terms of use will assign responsibility and provide for separation among participating aircraft.

14. MILITARY PROCEDURES

Military procedures in the form of additions, modifications, and exceptions to the basic FAA procedure are prescribed herein when a common procedure has not been attained or to fulfill a specific requirement. They shall be applied by:

a. ATC facilities operated by that service.

14.a. **Examples.**—

An Air Force facility providing service for an Air Force Base would apply USAF procedures to all traffic regardless of class.

A Navy facility providing service for a Naval Air Station would apply USN procedures to all traffic regardless of class.

b. ATC facilities, regardless of their parent organization (FAA, USAF, USN, USA), supporting a designated military airport exclusively. This designation determines which military procedures are to be applied.

14.b. Examples.—

An FAA facility supports a USAF Base exclusively—USAF procedures are applied to all traffic at that base.

An FAA facility provides approach control service for a Naval Air Station as well as supporting a civil airport—Basic FAA procedures are applied at both locations by the FAA facility.

A USAF facility supports a USAF Base and provides approach control service to a satellite civilian airport—USAF procedures are applied at both locations by the USAF facility.

14.b. Reference.—Annotations, 3.

c. Other ATC facilities when specified in a Letter of Agreement.

14.c. Example.—

A USAF Unit is using a civil airport supported by an FAA facility—USAF procedures will be applied as specified in a Letter of Agreement between the unit and the FAA facility to the aircraft of the USAF Unit. Basic FAA procedures will be applied to all other aircraft.

15-20. RESERVED

Section 3. ABBREVIATIONS

→ 21. ABBREVIATIONS

As used in this manual, the following abbreviations have the meanings indicated.

Abbreviation	*Meaning*
AC	Assistant Chief
ACLS	Automatic Carrier Landing System
ACP	Area Command Post
ADC	Aerospace Defense Command
AIM	Airman's Information Manual
AIRMET	Airmen's meterological information
ALNOT	Alert notice
ALS	Approach light system
ALTRV	Altitude reservation
AMB	Ambiguity—A disparity greater than 2 miles exists between the position declared for a target by ARTS and another facility's computer declared position during interfacility handoff
ANG	Air National Guard
APREQ	Approval request
ARAC	Radar approach control facility (USA)
ARCP	Air refueling control point
ARINC	Aeronautical Radio Incorporated
ARIP	Air refueling initial point
ARSR	Air route surveillance radar
ARTCC	Air route traffic control center
ASDE	Airport surface detection equipment
ASR	Airport surveillance radar
ATC	Air traffic control
ATCAA	ATC Assigned Airspace
ATCRBS	Air traffic control radar beacon system
ATCSCC	Air Traffic Control Systems Command Center
ATIS	Automatic terminal information service
ATPAC	Air Traffic Procedures Advisory Committee
ATS	Air Traffic Service
CACT	Civil Air Carrier Turbojet
CARF	Central Altitude Reservation Function
CAT	Clear air turbulence
CELNAV	Celestial Navigation Training
CCC	Regional Communications Control Center
CERAP	Combined Center/RAPCON
CFCF	Central Flow Control Function
COPCOM	Controllers' Operations/Procedures Committee
DF	Direction finder
DH	Decision height
DMAAC	Defense Mapping Agency Aerospace Center
DMAHC	Defense Mapping Agency Hydrographic Center
DME	Distance measuring equipment compatible with TACAN
DOE	Department of Energy
EAC	Expect approach clearance
ECM	Electronic Counter Measure
EFAS	Enroute Flight Advisory Service
EFC	Expect further clearance
ELT	Emergency Locator Transmitter
ETA	Estimated time of arrival
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FDEP	Flight Data Entry and Printout
FIFO	Flight Inspection Field Office
FIR	Flight information region
FL	Flight level
FLIP	Flight Information Publication
FRC	Full route clearance necessary
FSDO	Flight Standards District Office
FSNFO	Flight Standards National Field Office
FSS	Flight service station
FTS	Federal Telecommunications System
FW/SIFR	Fixed-Wing Special Instrument Flight Rules
FW/SVFR	Fixed-Wing Special Visual Flight Rules
GCA	Ground controlled approach
HIRL	High intensity runway lights
ICAO	International Civil Aviation Organization
IDENT	Aircraft Identification
IFR	Instrument flight rules
IFSS	International flight service station
INF	Inland Navigation Facility
INREQ	Information request
→ IR	IFR Military Training Route
JATO	Jet assisted takeoff
L/MF	Low/medium frequency
LAWRS	Limited aviation wea. reporting station
LLWSAS	Low level wind shear alert system
MALS	Medium intensity approach light system
MALSR	Medium approach light system with runway alignment indicator lights
MAP	Missed approach point
MARSA	Military authority assumes responsibility for separation of aircraft
MCA	Minimum crossing altitude

Abbreviation	*Meaning*
MDA	Minimum descent altitude
MEA	Minimum enroute (IFR) altitude
MIRL	Medium intensity runway lights
MITO	Minimum interval takeoff
MOA	Military Operations Area
MOCA	Minimum obstruction clearance altitude
MSAW	Minimum Safe Altitude Warning
MRA	Minimum reception altitude
MSL	Mean sea level
MTI	Moving target indicator
MTR	Military Training Route
MVA	Minimum vectoring altitude
NAR	North American Route
NAS	National Airspace System
NAT	Not ARTS tracked (ARTS is not tracking the target and no ambiguity check can be made.)
NBCAP	National Beacon Code Allocation Plan
NDB	Non-Directional Radio Beacon
NOAA	National Oceanic and Atmospheric Administration
NORAD	North American Air Defense Command
NOS	National Ocean Survey
NWS	National Weather Service
NTZ	No Transgression Zone
PAR	Precision approach radar
PDAR	Preferential Departure Arrival Route
PBCT	Proposed Boundary Crossing Time
PCA	Positive Control Area
PAR	Preferential Arrival Route (Stage A)
PDR	Preferential Departure Route
RAC	Department of Energy special flight
RAIL	Runway alignment indicator lights
RAPCON	Radar approach control facility (USAF)
RATCF	Radar air traffic control facility (USN)
RBS	Radar bomb scoring
RCC	Rescue Coordination Center
RCLS	Runway centerline system
RCR	Runway condition reading
REIL	Runway end identifier lights
RNAV	Area Navigation
RVR	Runway visual range
RVV	Runway visibility value
SAC	Strategic Air Command
SAFI	Semi-automatic flight inspection
SAR	Search and rescue
SFA	Single frequency approach
SFO	Simulated flameout
SID	Standard instrument departure
SIGMET	Significant meteorological information
STAR	Standard terminal arrival
STOL	Short takeoff and landing
SVFR	Special Visual Flight Rules
TACAN	TACAN-UHF navigational aid (omnidirectional course and distance information)
TCA	Terminal Control Area
TDZL	Touchdown zone light system
TRACAB	Terminal radar approach control in tower cab
TRACON	Terminal radar approach control
TRSA	Terminal Radar Service Area
UHF	Ultra high frequency
USA	United States Army
USAF	United States Air Force
USN	United States Navy
UTM	Unsatisfactory transmission message
VFR	Visual flight rules
VHF	Very high frequency
VOR	VHF navigational aid (omnidirectional course information)
VOR-DME	Collocated VOR and DME navigational aids (VHF course and UHF distance information)
VORTAC	Collocated VOR and TACAN navigation aids (VHF and UHF course and UHF distance information)
→ VR	VFR Military Training Route
WSFO	Weather Service Forecast Office
WSO	Weather Service Office

Chapter 2. GENERAL CONTROL

Section 1. GENERAL

22. DUTY PRIORITY

Give first priority to separation of aircraft as required in this handbook and to the issuance of safety advisories. Give second priority to other services that are required but do not involve separation of aircraft. Give third priority to additional services to the extent possible.

22. **Note.**—Priority for the handling of emergencies cannot be prescribed because of the infinite variety of possible situations which may occur.

22. **Reference.**—Emergencies, Chapter 8; Safety Advisory, 33.

23. PROCEDURAL PREFERENCE

a. Use automation procedures in preference to nonautomation procedures when workload, communications and equipment capabilities permit.

b. Use radar separation in preference to nonradar separation when it will be to an operational advantage and workload, communications and equipment permit.

c. Use nonradar separation in preference to radar separation when the situation dictates that an operational advantage will be gained.

23.c. **Note.**—One situation may be where vertical separation would preclude excessive vectoring.

24. OPERATIONAL PRIORITY

Provide air traffic control service to aircraft on a "first come, first served" basis as circumstances permit, except the following:

24. **Note.**—It is solely the pilot's prerogative to cancel his IFR flight plan. However, a pilot's retention of an IFR flight plan does not afford priority over VFR aircraft. For example, this does not preclude the requirement for the pilot of an arriving IFR aircraft to adjust his flight path, as necessary, to enter a traffic pattern in sequence with arriving VFR aircraft.

24. **Reference.**—FAR 91.67(b), An aircraft in distress has the right of way over all other air traffic.

a. Provide priority to civilian air ambulance flights (LIFEGUARD). When requested, provide priority to military air evacuation flights (AIR EVAC, MED EVAC). Assist the pilots of air ambulance/evacuation aircraft to avoid areas of significant weather and turbulent conditions. When requested by a pilot, provide notifications to expedite ground handling of patients, vital organs, or urgently needed medical materials.

b. Provide maximum assistance to SAR aircraft performing a SAR mission.

24.b. **Reference.**—Providing Assistance, 1552.

c. Provide special handling, as required to expedite a SAFI aircraft.

24.c. **Reference.**—SAFI Aircraft, 1452.

d. Expedite the movement of Presidential aircraft and entourage and any rescue support aircraft as well as related control messages, when traffic conditions and communications facilities permit.

24.d. **Note.**—As used herein the terms Presidential aircraft and entourage include aircraft and entourage of the President, Vice President or other public figures when designated by the White House.

24.d. **Reference.**—Presidential and Vice Presidential Aircraft, 87.e. and f. 7210.3—600, Advance Coordination.

e. Expedite movement of NIGHT WATCH aircraft when NEACP (pronounced KNEECAP) is indicated in the remarks section of the flight plan or in air/ground communications.

24.e. **Note.**—The term "NEACP" will not be a part of the call sign but may be used when the aircraft is airborne to indicate a request for special handling.

24.e. **Reference.**—Handbook 7610.4—1480.

f. Provide expeditious handling for any civil or military aircraft using the code name "FLYNET."

24.f. **Reference.**—FLYNET, 1504. 7610.4—1522.

g. Provide expeditious handling of aircraft using the code name "Garden Plot" only when CARF notifies you that such priority is authorized. Refer any questions regarding flight procedures to CARF for resolution.

24.g. Note.—Garden Plot flights require priority movement and are coordinated by the military with CARF. State authority will contact the Regional Director to arrange for priority of National Guard troop movements within a particular State.

h. Provide special handling for USAF aircraft engaged in aerial sampling missions, using the code name "SAMP".

24.h. Reference.—SAMP, 1503. 7210.3—633, Atmospheric Sampling for Nuclear Contamination. 7610.4—1524.

i. IFR aircraft shall have priority over FW/SIFR and SVFR aircraft.

24.i. Reference.—Special VFR, Chapter 3, Section 16.

25. CONTROL TRANSFER

Transfer control responsibility inter/intrafacility at a time, fix, or altitude and only after eliminating any potential conflict with other aircraft under the jurisdiction of the transferring facility or controller.

25. Reference.—Coordinate Use of Airspace, 34.

→ 26. RADIO COMMUNICATIONS TRANSFER

Transfer radio communications by specifying the following:

26. Note.—Radio communications transfer procedures may be specified by Letter of Agreement or contained in the route description of an MTR and as published in the DOD Planning AP/1B (AP/3).

a. The facility name or location name and terminal function to be contacted. *TERMINAL:* Omit the location name when transferring communications to another controller within your facility except as required in **1162.**

b. Frequency to use except the following may be omitted:

(1) FSS frequency.

(2) Departure frequency if previously given.

(3) *TERMINAL:*

(a) Ground control frequency or the numbers preceding the decimal point.

(b) Local control frequency, if in your opinion this usage will be clearly understood by the pilot.

26.b. Examples.—

"Contact tower." "Contact ground." "Contact ground point seven." "Contact Huntington Radio." "Contact departure." "Contact Los Angeles Center one two three point four."

c. Time, fix, altitude, or specifically when to contact a facility. You may omit this when compliance is expected upon receipt.

26.c. Note.—The AIM, paragraph 340, informs pilots that they are expected to maintain a listening watch on the transferring controller's frequency until the time, fix or altitude specified.

Phraseology:

CONTACT (facility name or location name and terminal function), (frequency).

If required

AT (time, fix/altitude).

27. FORMATION FLIGHTS

Control formation flights as a single aircraft. When individual control is requested, issue advisory information which will assist the pilots in attaining separation. When pilot reports indicate separation has been established, issue control instructions as required.

27. Note 1.—Separation responsibility between aircraft within the formation during transition to individual control rests with the pilots concerned until standard separation has been attained.

27. Note 2.—Formation join-up and breakaway will be conducted in VFR weather conditions unless prior authorization has been obtained from ATC or individual control has been approved.

27. Reference.—Formation Flight Aircraft and Other Aircraft, 745. Glossary (Formation Flight).

28. PILOT REQUESTS

Approve or disapprove a request as circumstances permit. In cases where specific phraseology is not set forth for the applicable procedure, use the following phraseology to approve or disapprove these requests.

Phraseology:

APPROVED AS REQUESTED.

(Requested operation) APPROVED.

UNABLE (requested operation).

When necessary

(reason and/or additional instructions.)

Section 2. WEATHER INFORMATION

40. FAMILIARIZATION

Become familiar with pertinent weather information when coming on duty and stay aware of current weather information needed to perform air traffic control duties.

41. SIGMET ALERT

a. Broadcast a SIGMET alert once on all frequencies, except emergency frequencies, when any part of the area described in the SIGMET is within 150 miles of the airspace under your jurisdiction. The broadcast is not required if aircraft on your frequency/s will not be affected by the weather addressed in the SIGMET.

b. Terminal facilites have the option to limit the SIGMET broadcast as follows. Local control, and approach control positions serving arrival aircraft, may opt to broadcast SIGMET alerts only when any part of the area described in the SIGMET is within 50 miles of the airspace under their jurisdiction.

c. Include the following information in SIGMET broadcast.

(1) The term "convective" when applicable.

(2) SIGMET number.

(3) General description of the area affected.

(4) Brief description of the type of weather.

41.c.(4) Note 1.—The message should be brief but contain enough information to alert pilots of significant weather conditions along their route of flight and to enable them to decide whether they should contact an FSS for more detailed SIGMET information.

41.c.(4) Note. 2.—FSSs within 150 miles of the SIGMET area broadcast SIGMETs once upon receipt and at 15 minute intervals (H+00, H+15, H+30, and H+45) during the first hour after issuance and thereafter broadcast a brief notice at H+15 and H+45 during the valid period of the SIGMET.

Phraseology:

ATTENTION ALL AIRCRAFT, SIGMET/CONVECTIVE SIGMET (number). (Brief description of area affected and type of weather.)

41. Examples.—

"Attention all aircraft, SIGMET Delta Three. From Myton to Tuba City to Milford. Severe turbulence and severe clear icing below one zero thousand feet. Expected to continue beyond zero three zero zero Greenwich."

"Attention to all aircraft, Convective SIGMET Two Seven Eastern. From the vicinity of Elmira to Phillipsburg. Scattered embedded thunderstorms moving east at one zero knots. A few intense level five cells, maximum tops four five zero."

42. REPORTING WEATHER CONDITIONS

a. *USA/USAF NOT APPLICABLE.* When the prevailing visibility at the usual point of observation, or at the tower level, is less than 4 miles, tower personnel shall take prevailing visibility observations and apply the observations as follows:

(1) Use the lower of the two observations (tower or surface) for aircraft operations.

(2) Forward tower visibility observations to the weather observer.

(3) Notify the weather observer when the tower observes the prevailing visibility to decrease to less than 4 miles or increase to 4 miles or more.

b. Forward current weather changes to the appropriate control facility as follows:

(1) When the official weather changes to a condition which is below 1,000-foot ceiling or below the highest circling minimum, whichever is greater, or less than 3 miles visibility, and when it improves to a condition which is better than those above.

USAF: Use 1,500 foot ceiling.

(2) Changes which are classified as special weather observations during the time that weather conditions are below 1,000-foot ceiling or the highest circling minimum, whichever is greater, or less than 3 miles visibility.

USAF: Use 1,500 foot ceiling.

c. Towers at airports where military turbojet en route descents are routinely conducted shall also report the conditions to the ARTCC even if it is not the controlling facility.

d. If the receiving facility informs you that weather reports are not required, discontinue the reports. The time period specified should not exceed the duration of your tour of duty.

e. *EN ROUTE:* When you determine that weather reports for an airport will not be required for a specific time period, inform the FSS or tower of this determination. The time period specified should not exceed the duration of your tour of duty.

43-44. RESERVED

Section 3. ADDITIONAL SERVICES

→ 45. APPLICATION

Provide additional services to the extent possible, contingent only upon higher priority duties and other factors including limitations of radar, volume of traffic, frequency congestion, and workload.

45. Note.—The primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic. In addition to its primary function, the ATC system has the capability to provide (with certain limitations) additional services. The ability to provide additional services is limited by many factors such as the volume of traffic, frequency congestion, quality of radar, controller workload, higher priority duties, and the pure physical inability to scan and detect those situations that fall in this category. It is recognized that these services cannot be provided in cases in which the provision of services is precluded by the above factors. Consistent with the aforementioned conditions, controllers shall provide additional service procedures to the extent permitted by higher priority duties and other circumstances. The provision of additional services is not optional on the part of the controller, but rather is required, when the work situation permits.

45. Reference.—Duty Priority, 22.

→ 46. TRAFFIC ADVISORIES

Unless an aircraft is operating within positive controlled airspace or omission is requested by the pilot, issue traffic advisories to all aircraft (IFR or VFR) on your frequency when in your judgment their proximity may diminish to less than the applicable separation minima. Provide this service as follows:

a. To radar identified aircraft:

(1) Azimuth from aircraft in terms of the 12-hour clock.

(2) Distance from aircraft in miles.

(3) Direction in which traffic is proceeding and/or relative movement of traffic.

46.a.(3) Note.—Relative movement includes closing, converging, parallel same direction, opposite direction, diverging, overtaking, crossing left to right, crossing right to left.

(4) If known, type of aircraft and altitude.

46.a.(4) Reference.—Description of Aircraft Types, 88.

(5) If Mode C altitude readout is not verified, state the word "unverified" before the altitude.

46.a.(5) Note.—In a radar environment, altitude information will be ascertained by either a report or verified Mode C. Altitude readout which is unverified may still be helpful provided the pilot knows it is not verified.

Phraseology:

TRAFFIC, (number) O'CLOCK (number of miles) MILES, (direction)-BOUND *and/or* (relative movement) *and if known* (type of aircraft and altitude).

If altitude is unknown,

ALTITUDE UNKNOWN.

If altitude is unverified Mode C,

UNVERIFIED (altitude).

46.a. Examples

"Traffic, eleven o'clock, one zero miles, southbound, converging, DC-8, one seven thousand."

"Traffic, twelve o'clock, one five miles, opposite direction, altitude unknown."

"Traffic, two o'clock, one one miles, westbound, unverified six thousand five hundred."

"Traffic, numerous targets, vicinity of Delia Airport."

(6) When requested by the pilot, issue radar vectors to assist in avoiding the traffic, provided the aircraft to be vectored is within your area of jurisdiction or coordination has been effected with the sector/facility in whose area the aircraft is operating.

(7) If unable to provide vector service, inform the pilot.

46.a.(7) Reference.—Pilot Request, 28.

(8) If the pilot informs you he does not see the traffic you have issued, inform him when the traffic is no longer a factor.

Phraseology:

TRAFFIC NO LONGER A FACTOR

or

(number) O'CLOCK TRAFFIC NO LONGER A FACTOR.

b. To aircraft that are not radar identified:

(1) Distance and direction from fix.

(2) Direction in which traffic is proceeding.

(3) If known, type of aircraft and altitude.

(4) ETA over the fix the aircraft is approaching, if appropriate.

Phraseology:

TRAFFIC, (number) MILES/MINUTES (direction) OF (airport or fix), (direction) BOUND, *and if known,* (type of aircraft and altitude), ESTIMATED (fix) (time)

or

TRAFFIC, NUMEROUS TARGETS VICINITY (location).

If altitude is unknown,

ALTITUDE UNKNOWN.

46.b. Examples.—

"Traffic, one zero miles east of Forsythe V-O-R, southbound, DC-8, descending to one six thousnad."

"Traffic, reported one zero miles west of Downey V-O-R, northbound, Apache, altitude unknown, estimated Joliet V-O-R one three one five."

"Traffic, eight minutes west of Chicago Heights V-O-R, westbound, Mooney, eight thousand, estimated Joliet V-O-R two zero three five."

47. MERGING TARGET PROCEDURES

a. Except while they are established in a holding pattern, apply merging target procedures to all radar identified:

(1) Aircraft at 10,000 feet and above.

(2) Turbojet aircraft regardless of altitude.

47.a.(2) Reference.—Glossary (Turbojet Aircraft).

(3) Presidential aircraft regardless of altitude.

b. Issue traffic information to those aircraft listed in **a.** whose targets appear likely to merge unless the aircraft are separated by more than the appropriate vertical separation minima.

c. If the pilot requests, vector his aircraft to avoid merging with the target of previously issued traffic.

47.c. Note.—Aircraft closure rates are so rapid that when applying merging target procedures, controller issuance of traffic must be commenced in ample time for the pilot to decide if a vector is necessary.

d. If unable to provide vector service, inform the pilot.

48. HOLDING PATTERN SURVEILLANCE

Provide radar surveillance of outer fix holding pattern airspace areas, or any portions thereof, shown on your radar scope (displayed on the video map or scribed on the map overlay) whenever aircraft are holding there. Attempt to detect any that stray outside the area. If you detect an aircraft straying outside the area, assist it to return to the assigned airspace.

48. Reference.—Deviation Advisories, 663.

49. PIREP INFORMATION

Significant PIREP information includes reports of strong frontal activity, squall lines, thunderstorms, moderate to severe icing, wind shear and turbulence (including clear air turbulence) of moderate or greater intensity, or other conditions pertinent to flight safety.

49. Reference.—7210.3—820, Handling of SIGMETS and PIREPS.

a. Solicit PIREPs when requested or when one of the following conditions exist or are forecast for your area of jurisdiction:

(1) Ceilings at or below 5,000 feet. These PIREPs shall include cloud base/tops reports when feasible.

(2) Visibility (surface or aloft) at or less than 5 miles.

(3) Thunderstorms and related phenomena.

(4) Turbulence of moderate degree or greater.

(5) Icing of moderate degree or greater.

(6) Wind shear.

b. Record with the PIREPs:

(1) Time.

(2) Aircraft position.

(3) Type aircraft.

(4) Altitude.

c. Obtain PIREPs directly from the pilot, or if the PIREP has been requested by another facility, you may instruct the pilot to deliver it directly to that facility.

Phraseology:

REQUEST FLIGHT CONDITIONS. REQUEST FLIGHT CONDITIONS AT PRESENT POSITION

or

OVER (fix)

or

ALONG PRESENT ROUTE

or

BETWEEN (fix) and (fix).

d. Handle PIREPs as follows:

(1) Relay pertinent PIREP information to concerned aircraft in a timely manner.

(2) *EN ROUTE:* Relay all operationally significant PIREPs to the facility weather coordinator.

(3) *TERMINAL:* Relay all operational significant PIREPs to:

(a) The appropriate intrafacility positions.

(b) The FSS serving the area in which the report was obtained.

49.d.(3)(b) Note.—The FSS is responsible for Service A teletypewriter dissemination.

(c) Other concerned terminal or en route ATC facilities, including non-FAA facilities.

50. WEATHER AND CHAFF SERVICES

a. Issue pertinent information on observed/reported weather or chaff areas. Provide radar navigational guidance and/or approve deviations around weather or chaff areas when requested by the pilot. Do not use the word "turbulence" in describing radar derived weather.

(1) Issue weather and chaff information by defining the area of coverage in terms of azimuth (by referring to the 12-hour clock) and distance from the aircraft or by indicating the general width of the area and the area of coverage in terms of fixes or distance and direction from fixes.

(2) When a deviation cannot be approved as requested and the situation permits, suggest an alternative course of action.

b. In areas of significant weather, plan ahead and be prepared to suggest, upon pilot request, the use of alternative routes/altitudes.

50.b. Note.—Weather significant to the safety of aircraft includes such conditions as tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, wind shear, moderate to extreme turbulence (including CAT), and moderate to severe icing.

c. Inform any tower for which you provide approach control services if you observe any weather echoes on radar which might affect their operations.

Phraseology:

WEATHER/CHAFF AREA BETWEEN (number) O'CLOCK AND (number) O'CLOCK (number) MILES

or

(number) MILE BAND OF WEATHER/CHAFF FROM (fix or number of miles and direction from fix) TO (fix or number of miles and direction from fix)

or

(level number and intensity adjective) WEATHER ECHO BETWEEN (number) O'CLOCK AND (number) O'CLOCK, (number) MILES. MOVING (direction) AT (number) KNOTS, TOPS (altitude).

50.c. Example.—"Level five intense weather echo between eleven o'clock and one o'clock, one zero miles. Moving east at two zero knots, tops flight level three niner zero."

50.c. Note.—The third phraseology is only applicable when the radar weather echo intensity information is determined by NWS radar equipment.

50.c. Reference.—Glossary (Radar Weather Echo Intensity Levels).

51. DISSEMINATING WEATHER INFORMATION

TERMINAL

Observed elements of weather information shall be disseminated as follows:

a. General weather information, such as "large breaks in the overcast," "visibility lowering to the south," or similar statements which do not include specific values, and any elements derived directly from instruments, pilots, or radar may be transmitted to pilots or other ATC facilities without consulting the weather reporting station.

b. Specific values, such as ceiling and visibility, may be transmitted if obtained by one of the following means:

(1) You are properly certificated and acting as official weather observer for the elements being reported.

51.b.(1) Note.—USAF controllers do not serve as official weather observers.

(2) You have obtained the information from the official observer for the elements being reported.

(3) The weather report was composed or verified by the weather station.

c. Differences between weather elements observed from the tower and those reported by the weather station shall be reported to the official observer for the element concerned.

52. BIRD ACTIVITY INFORMATION

a. Issue advisory information on pilot-reported or radar-observed and pilot-verified bird activity. Include position, species or size of birds, if known, course of flight, and altitude. Do this for at least 15 minutes after receipt of such information from pilots or from adjacent facilities unless visual observation or subsequent reports reveal the activity is no longer a factor.

Phraseology:

FLOCK OF (species, if known)/(size, if known) BIRDS, (number) O'CLOCK (number of miles) MILES (direction)-BOUND, LAST REPORTED AT (altitude, as determined from pilot report)

or

ALTITUDE UNKNOWN.

FLOCK OF (species, if known)/(size, if known) BIRDS (direction)-BOUND ALONG (flyway or geographical route), LAST REPORTED AT (altitude, as determined from pilot report)

or

ALTITUDE UNKNOWN.

FLOCK OF/NUMEROUS FLOCKS (species, if known)/(size, if known) BIRDS, VICINITY (location), LAST REPORTED AT (altitude, as determined from pilot report)

or

ALTITUDE UNKNOWN.

52.a. Examples.—

"Flock of geese, one o'clock, seven miles, northbound, last reported at four thousand."

"Flock of small birds, southbound along Mohawk River, last reported at three thousand."

"Numerous flocks of ducks, vicinity Lake Winnebago, altitude unknown."

b. Relay bird activity information to adjacent facilities and to FSSs whenever it appears it will become a factor in their areas.

53–54. RESERVED

Section 4. NAVAID USE LIMITATIONS

55. ALTITUDE AND DISTANCE LIMITATIONS

When specifying a route other than an established airway or route, do not exceed the limitations in the **Table** on any portion of the route which lies within controlled airspace.

55. Table.—Altitude and Distance Limitations

VOR/VORTAC/TACAN NAVAIDS
Normal Usable Altitudes and Radius Distances

Class	*Altitudes*	*Distance (miles)*
T	12,000′ and below	25
L	Below 18,000′	40
H	Below 18,000′	40
H	14,500′–17,999′	*100
H	18,000′–FL 450	130
H	Above FL 450	100

*Applicable only within the conterminous 48 states.

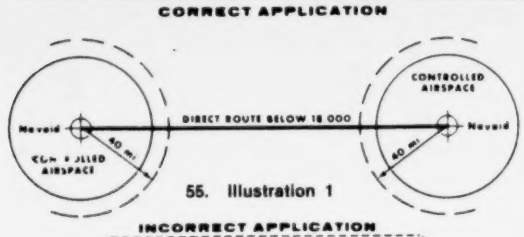
L/MF Radio Beacon (RBN)
Usable Radius Distances for All Altitudes

Class	*Power (watts)*	*Distance (miles)*
CL	Under 25	15
MH	Under 50	25
H	50–1,999	50
HH	2,000 or more	75

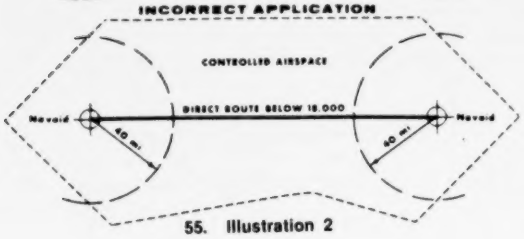
ILS
Usable Height and Distance*

Height above transmitter	*Distance (miles) from transmitter*
4,500	10 (for Glide Slope)
4,500	18 (for Localizer)

*Use current flight check height/altitude limitations if different from the above minima.



55. Illustration 1



55. Illustration 2

→ 56. EXCEPTIONS

Altitude and distance limitations need not be applied when:

a. Routing is initiated by ATC and radar monitoring is provided.

b. Routing is requested by the pilot and radar flight following is provided for air traffic control purposes.

56.b. Note.—Paragraph 290.i. requires radar monitoring be provided at FL 450 and below to aircraft on random (impromptu) RNAV routes. **Paragraph 720.a.** requires radar separation be provided for these routes at FL450 and below.

c. Operational necessity requires and approval has been obtained from the Frequency Management and Flight Inspection Offices to exceed them.

d. Requested routing is via an MTR.

57. CROSSING ALTITUDE

Use an altitude consistent with the limitations of the aid, when clearing an aircraft to cross or hold at a fix.

58. VFR CONDITIONS-ON-TOP

Use a route not meeting service volume limitations only if an aircraft requests to operate in VFR conditions-on-top on this route.

58. Note.—Aircraft equipped with TACAN-only are expected to:

a. Define route of flight between TACAN or VORTAC NAVAIDs in the same manner as VOR-equipped aircraft.

b. Except in positive control areas, submit requests for flight in VFR conditions-on-top where insufficient TACAN or VORTAC NAVAIDs exist to define the route.

→ 59. FIX USE

Request aircraft position reports only over fixes shown on charts used for the altitude being flown, except as follows:

59. Note.—Waypoints filed in random RNAV routes automatically become compulsory reporting points for the flight unless otherwise advised by ATC.

a. Unless the pilot requests otherwise, use only those fixes shown on High Altitude En Route Charts, High Altitude Instrument Approach Procedures Charts, and SID Charts when clearing military turbojet single-piloted aircraft.

b. Except for military single-piloted turbojet aircraft, unpublished fixes may be used if the name of the navaid and, if appropriate, the radial/course and frequency, are given to the pilot. An unpublished fix is defined as one approved and planned for publication which is not yet depicted on the charts or one which is used in accord with the following:

59.b. Reference.—7130.3, Holding Pattern Criteria.

(1) Unpublished fixes are formed by the en route radial and either a DME distance from the same navaid or an intersecting radial from an off-route VOR/VORTAC/TACAN. DME shall be used in lieu of off-route radials, whenever possible.

(2) Except where known signal coverage restrictions exist, an unpublished fix may be used for ATC purposes if its location does not exceed navaid altitude and distance limitations, and when off-route radials are used, the angle of divergence meets the criteria prescribed below.

59.b.(2) Note.—Unpublished fixes should not negate the normal use of published intersections. Frequent routine use of an unpublished fix would justify establishing a fix.

59.b.(2) Reference.—Altitude and Distance Limitations, 55.

(3) Do not hold aircraft at unpublished fixes below the lowest assignable altitude dictated by terrain clearance for the appropriate holding pattern airspace area (template) regardless of the MEA for the route being flown.

(4) When the unpublished fix is located on an off-route radial and the radial providing course guidance shall be used consistent with the following divergence angles.

(a) When holding operations are involved, with respect to (b) and (c) below, the angle of divergence shall be at least 45 degrees.

(b) When both navaids involved are located within 30 NM of the unpublished fix, the minimum divergence angle is 30 degrees.

(c) When the unpublished fix is located over 30 NM from the NAVAID generating the off-course radial, the minimum divergence angle shall increase 1 degree per nautical mile up to 45 NM, e.g., 45 NM would require 45 degrees.

(d) When the unpublished fix is located beyond 45 NM from the NAVAID generating the off-course radial, the minimum divergence angle shall increase ½ degree per nautical mile, e.g., 130 NM would require 88 degrees.

c. Fixes contained in the route description of MTRs are considered filed fixes.

60-64. RESERVED

Section 5. REPORTING ESSENTIAL FLIGHT INFORMATION

65. RESPONSIBILITY

Report as soon as possible to the appropriate FSS, airport manager's office, ARTCC, approach control facility, operations office or military operations office any information concerning components of the NAS or any flight conditions which may have an adverse effect on air safety.

65. **Note.**—FSSs are responsible for classifying and disseminating notices to airmen.

65. **Reference.**—Timely Information, 940. 7210.3—301, Periodic Maintenance. USN, see OPNAVINST 2112.2D.

66. LANDING AREA CONDITION

TERMINAL

If you observe or are informed of any condition which affects the safe use of a landing area:

66. **Note 1.**—Airport management/military operations office is responsible for observing and reporting the condition of the landing area.

66. **Note 2.**—It is the responsibility of the agency operating the airport to provide the tower with current information regarding airport conditions.

66. **Note 3.**—A disabled aircraft on a runway, after occupants are clear, is normally handled by Flight Standards and airport management/military operations office personnel in the same manner as any obstruction, e.g., construction equipment.

a. Relay the information to the airport manager/military operations office concerned.

b. Copy verbatim any information received and record the name of the person submitting it.

c. Confirm information obtained from other than authorized airport or FAA personnel unless this function is the responsibility of the military operations office.

66.c. **Note.**—Civil airport managers are required to provide a list of airport employees who are authorized to issue information concerning conditions affecting the safe use of the airport.

d. If you are unable to contact the airport management or operator, issue a Notice to Airmen publicizing an unsafe condition and inform the management or operator as soon as practicable.

66.d. **Example.**—

"Disabled aircraft on runway."

66.d. **Note 1.**—Legally, only the airport management/military operations office can close a runway.

66.d. **Note 2.**—Military controllers are not authorized to issue Notices to Airmen. It is the responsibility of the military operations office.

67-69. RESERVED

Section 6. RADIO AND INTERPHONE COMMUNICATIONS

70. RADIO COMMUNICATIONS

Use radio frequencies for the special purposes for which they are intended. A single frequency may be used for more than one function except as follows:

TERMINAL: When combining positions in the tower, do not use ground control frequency for airborne communications.

70. **Note.**—Due to the limited number of frequencies assigned to towers for the ground control function, it is very likely that airborne use of a ground control frequency could cause interference to other towers or interference to your aircraft from another tower. When combining these functions, it is recommended combining them on local control. The ATIS may be used to specify the desired frequency.

71. MONITORING

Monitor interphones and assigned radio frequencies continuously.

71. **Note.**—Although all FAA facilities, including RAPCONs and RATCFs, are required to monitor all assigned frequencies continuously, USAF facilities may not monitor all unpublished discrete frequencies.

72. AUTHORIZED INTERRUPTIONS

As necessary, authorize a pilot to interrupt his communications guard.

72. **Note.**—Some users have adopted procedures to insure uninterrupted receiving capability with ATC when a pilot with only one operative communications radio must interrupt his communications guard because of a safety related problem requiring airborne communications with his company. In this event, pilots will request approval to abandon guard on the assigned ATC frequency for a mutually agreeable time period. Additionally, they will inform controllers of the NAVAID voice facility and the company frequency they will monitor.

73. AUTHORIZED TRANSMISSIONS

Transmit only those messages necessary for air traffic control or otherwise contributing to air safety.

73. **Reference.**—7210.3—321.

→ 74. AUTHORIZED RELAYS

a. Relay operational information to aircraft or aircraft operators as necessary. Do not agree to handle such messages on a regular basis. Give the source of any such message you relay.

b. Relay official FAA messages as required.

74.b. **Example.**—

"Miami Center, Convair One Zero Four, this is Safe Air One, (message)".

74.b. **Note.**—The FAA Administrator and Deputy Administrator will sometimes use code phrases to identify themselves in air to ground communications as follows:

a. Administrator—"Safe Air One."

b. Deputy Administrator—"Safe Air Two."

c. Relay operational information to military aircraft flight planned to or operating on IRs.

75. RADIO MESSAGE FORMAT

Initiate radio communication with an aircraft by using the following format:

a. Initial call-up:

(1) Identification of the aircraft being called.

(2) Identification of the calling unit.

(3) The type of message to follow when this will assist the pilot.

(4) The word "over" if required.

b. Replying to call-up from aircraft:

(1) Identification of the aircraft initiating the call-up.

(2) Identification of the replying unit.

(3) Transmit message.

(4) The word "over" if required.

c. Use the same format as for initial call-up and reply after communication has been established except, after stating the identification of the calling or replying unit, state the message to be sent or acknowledgment of the message received.

d. Preface a clearance or instruction intended for a specific aircraft with the identification of that aircraft. *TERMINAL:* You may omit aircraft identification after initial call-up when conducting the final portion of a radar approach.

76. ABBREVIATED TRANSMISSIONS

Transmissions may be abbreviated as follows:

a. Use identification prefix and the last 3 digits or letters of aircraft identification after communications have been established and type of aircraft is known. Do not abbreviate similar sounding aircraft identifications or the identification of an air carrier or other civil aircraft having an FAA authorized call-sign.

76.a. **Reference.**—Aircraft Identification, 87.

b. Omit facility identification after communication has been established.

c. Transmit message immediately after call-up (without waiting for aircraft reply) when it is short and receipt is generally assured.

d. Omit the word "over" if the message obviously requires a reply.

77. INTERPHONE TRANSMISSION PRIORITIES

Give priority to interphone transmissions as follows:

a. First priority—Emergency messages including essential information on aircraft accidents or suspected accidents. After an actual emergency has passed, give a lower priority to messages relating to that accident.

b. Second priority—Clearances and control instructions.

c. Third priority—Movement and control messages using the following order of preference when possible:

(1) Progress reports.
(2) Departure or arrival reports.
(3) Flight plans.

d. Fourth priority—Movement messages on VFR aircraft.

78. PRIORITY INTERRUPTION

Use the words "emergency" or "control" for interrupting lower priority messages when you have an emergency or control message to transmit.

79. INTERPHONE MESSAGE FORMAT

Use the following format for interphone (override/handoff line) intra/interfacility communications:

a. Caller states the identification of the position being called followed by the position identification of the caller.

b. Receiver states position identification followed by acknowledgement of the call.

79.b. Note.—**a.** and **b.** may be reversed if operationally beneficial.

c. Caller states message.

d. Receiver states response to caller's message followed by operating initials.

e. Caller states operating initials.

79. Example 1.—
Caller—"Denver High, R Twenty-five."
Receiver—"Denver High."
Caller—"Request direct Denver for Eastern Three Twenty-eight."
Receiver—"Eastern Three Twenty-eight direct Denver approved. H.F."
Caller—"G.M."

79. Example 2.—
Receiver—"Denver High, go ahead override."
Caller—"R Twenty-five, request direct Denver for Eastern Three Twenty-eight."
Receiver—"Eastern Three Twenty-eight direct Denver approved. H.F."
Caller—"G.M."

80. INTERPHONE MESSAGE TERMINATION

Terminate interphone messages with your operating initials.

81. RESERVED

82. WORDS AND PHRASES

Use the words or phrases in radiotelephone and interphone communication as contained in the **Glossary, Appendix 4.** The word "heavy" shall be used in inter/intra facility communications for heavy jet identification and in communications with heavy jet aircraft.

82. Example.—
"United Fifty-eight heavy."

82. Note.—Most airlines will use the word "heavy" following the company prefix and trip number when establishing communications or when changing frequencies within a terminal facility area.

83. EMPHASIS FOR CLARITY

Emphasize appropriate digits, letters, or similar sounding words to aid in distinguishing between similar sounding aircraft identifications. Additionally:

a. Notify each pilot concerned when communicating with aircraft having similar sounding identifications.

83.a. Examples.—"United Thirty-one United, Miami Center, Eastern Thirty-one is also on this frequency, acknowledge." "Eastern Thirty-one Eastern, Miami Center, United Thirty-one is also on this frequency, acknowledge."

83.a. Reference.—Aircraft Identification, 87. 7210.3—210, Aircraft Identification Problems.

b. Identify the interphone voice line on which the call is being made when two or more such lines are collocated at the receiving operating position.

83.b. Example.—
"Washington Center, Washington Approach on the 57 line. Chicago Center, O'Hare Tower handoff on the Departure West line."

84. ICAO PHONETICS

Use the ICAO phonetic alphabet in the **Table** to clarify individual letter as necessary.

84. Table.—ICAO Phonetics

A—Alfa	N—November
B—Bravo	O—Oscar
C—Charlie	P—Papa
D—Delta	Q—Quebec
E—Echo	R—Romeo
F—Foxtrot	S—Sierra
G—Golf	T—Tango
H—Hotel	U—Uniform
I—India	V—Victor
J—Juliett	W—Whiskey
K—Kilo	X—X-ray
L—Lima	Y—Yankee
M—Mike	Z—Zulu

85. NUMBERS USAGE

State numbers as follows:

a. Serial numbers—The separate digits.

85.a. Examples.—

Number	*Statement*
11,495	"One one four niner five."
20,069	"Two zero zero six niner."

b. Altitudes or flight levels:

(1) Altitudes—The separate digits of the thousand plus the hundreds.

85.b.(1) Example.—

Altitude	*Statement*
17,900	"One seven thousand niner hundred."

(2) Flight levels—The words "flight level" followed by the separate digits of the flight level.

85.b.(2) Examples.—

Flight Level	*Statement*
180	"Flight level one eight zero."
275	"Flight level two seven five."

(3) MDA/DH Altitudes—The separate digits of the MDA/DH altitude.

85b.(3) Examples.—

MDA/DH Altitude	*Statement*
1,320	"Published minimum descent altitude, one three two zero"
486	"Published decision height, four eight six"

c. Time:

(1) General time information—The 4 separate digits of the hour and minutes based on the 24-hour clock in terms of Greenwich Mean Time (GMT).

85.c.(1) Examples.—

Time (12 hr.)	*Time (24 hr.)*	*Statement*
1:15 a.m.	0115	"Zero one one five."
1:15 p.m.	1315	"One three one five."

(2) Upon request—The 4 separate digits of the hours and minutes in terms of GMT, followed by local standard time equivalents.

85.c.(2) Example.—

Time	*Statement*
1430 PST (2230 GMT)	"Two two three zero Greenwich, one four three zero Pacific."

(3) Time check—The word "time" followed by the 4 separate digits of the hour, minutes, and nearest quarter minute.

85.c.(3) Example.—

Time	*Statement*
1415¾	"Time, one four one five and three-quarters."

(4) Abbreviated time—The separate digits of the minutes only.

85.c.(4) Examples.—

Time	*Statement*
1415	"One five."
1420	"Two zero."

d. Field elevation—The words "field elevation," followed by the separate digits of the elevation.

85.d. Examples.—

Elevation	*Statement*
17 feet	"Field elevation, one seven."
817 feet	"Field elevation, eight one seven."
2,817 feet	"Field elevation, two eight one seven."

e. The number "0," except where it appears in group form—The word "zero."

85.e. Example.—

"Field elevation one six zero."

f. Altimeter setting—The word "altimeter" followed by the separate digits of the altimeter setting.

85.f. Example.—

Setting	*Statement*
30.01	"Altimeter, three zero zero one."

g. Surface wind—The word "wind" followed by separate digits of the indicated wind direction to the nearest 10-degree multiple, the word "at," and the separate digits of the indicated velocity in knots.

85.g. Examples.—

"Wind zero three zero at two five."

"Wind two seven zero at one five peak gusts three five."

h. Heading— The word "heading" followed by the 3 separate digits of the number of degrees, omitting the word "degrees." Use heading 360 degrees to indicate a north heading.

85.h. Examples.—

Heading	*Statement*
5 degrees	"Heading zero zero five."
30 degrees	"Heading zero three zero."
360 degrees	"Heading three six zero."

i. Radar beacon codes—The separate digits of the 4-digit code.

85.i. Examples.—

Code	*Statement*
1000	"One zero zero zero."
2100	"Two one zero zero."

j. Runways—The word "runway," followed by the separate digits of the runway designation. For a parallel runway, state the word "left," "right," or "center" if the letter "L," "R," or "C" is included in the designation. *USAF:* Prefix the word "zero" for runways designated 1 through 9.

85.j. Examples.—

Designation	*Statement*
3	"Runway Three."
	USAF: "Runway Zero Three."
8L	"Runway Eight Left."
	USAF: "Runway Zero Eight Left."
27R	"Runway Two Seven Right."

k. Frequencies—The separate digits of the frequency, inserting the word "point" where the decimal point occurs. Omit digits after the second digit to the right of the decimal point. When the frequency is in the L/MF band, include the word "kiloHertz."

85.k. Examples.—

Frequency		*Statement*
126.55	MHz	"One two six point five five."
369.0	MHz	"Three six niner point zero."
121.5	MHz	"One two one point five."
135.275	MHz	"One three five point two seven."
302	kHz	"Three zero two kiloHertz."

l. Speeds—The separate digits of the speed followed by the word "knots", except as required by **821.**, Speed Adjustment Methods.

85.l. Examples.—

Speed	*Statement*
250	"Two five zero knots."
180	"One eight zero knots."
90	"Niner zero knots.

m. Miles—The separate digits of the mileage followed by the word mile.

85.m. Examples.—

"Three zero mile arc east of Nottingham."

"Traffic, one o'clock, two five miles, northbound, DC-8, flight level two seven zero."

86. FACILITY IDENTIFICATION

Identify facilities as follows:

a. Airport traffic control towers—State the name of the facility, followed by the word "tower." Where military and civil airports are located in the same general area and have similar names, state the name of the military service followed by the name of the military facility and the word "tower."

86.a. Examples.—

"Columbus Tower."

"Barksdale Tower."

"Navy Jacksonville Tower."

b. Air route traffic control centers—State the name of the facility, followed by the word "center."

c. Approach control facilities, including RAPCONs, RATCFs, and ARACs—State the name of the facility, followed by the word "approach." Where military and civil facilities are located in the same general area and have similar names, state the name of the military service, followed by the name of the military facility and the word "approach."

86.c. Examples.—

"Denver Approach."

"Griffiss Approach."

"Navy Jacksonville Approach."

d. Functions within a terminal facility—State the name of the facility, followed by the name of the function.

86.d. Examples.—

"Boston Departure."

"La Guardia Clearance Delivery."

"O'Hare Ground."

e. When calling or replying on an interphone line which connects only 2 facilities, you may omit the facility name.

86.e. Example.—

"Bradford High, handoff."

f. Communications stations:

(1) FAA flight service stations—State the name of the station, followed by the word "radio."

(2) Air Force—State the name of the station, followed by the word "airways."

86.f.(2) Example.—

"Brookley Airways."

(3) Navy—State the word "Navy," followed by the name of the station and the word "radio."

86.f.(3) Example.—
"Navy Jacksonville Radio."

g. Radar facilities having ASR or PAR but not providing approach control service—State the name of the facility, followed by the letters "G-C-A."

86.g. Examples.—
"Chanute G-C-A."
"Corpus Christi G-C-A."
"Davison G-C-A."

87. AIRCRAFT IDENTIFICATION

Identify aircraft as follows: Use the full identification in reply to aircraft with similar sounding identifications. For other aircraft, the same identification may be used in reply that the pilot used in his initial call-up except use the correct identification after communications have been established.

a. Civil—State the aircraft type, model or manufacturer's name, or if none of these are known, the digits/letters of the registration number.

87.a. Examples.—
"Jet Commander One Four Two Four."
"Douglas Three Zero Five Romeo."
"Bonanza One Two Three Four Tango."
"One Zero Xray Yankee."

(1) Air carrier and other civil aircraft having FAA authorized call-signs—State the call-sign followed by the flight number in group form.

87.a.(1) Examples.—
"American Five Twenty-one."
"Commuter Six Eleven."
"General Motors Thirty-seven."

(2) If aircraft identification becomes a problem when the procedures specified in (1) are used, the call sign shall be restated after the flight number of the aircraft involved.

87.a.(2) Examples.—
"American Five Twenty-one American."
"Commuter Six Eleven Commuter."
"General Motors Thi ty-seven General Motors."

87.a.(2) Reference.—7210.3—210, Aircraft Identification Problems.

(3) Air taxi and commercial operators not having FAA authorized call signs—State the prefix 'TANGO' on initial contact, if used by the pilot, followed by the registration number. The prefix may be dropped in subsequent communications.

87.a.(3). Examples.—
"Tango Mooney Five Five Five Two Quebec."
"Tango One Two Three Four."

b. Civilian airborne ambulance—State the word "LIFEGUARD" followed by type, digits and letters of the registration number.

87.b. Example.—
"LIFEGUARD Cessna Two Six Four Six."

c. U.S. military—State one of the following:

(1) The service name, followed by the word "copter," when appropriate, and the last 5 digits of the serial number.

87.c.(1) Examples.—
"Navy Five Six Seven One Three."
"Coast Guard Six One Three Two Seven."
"Air Guard One Three Five Eight Six."
"Army Copter Three Two One Seven Six."

87.c.(1). Note.—If aircraft identification becomes a problem, procedures in 87.a.(2) will apply.

(2) Special military operations—State one of the following followed by the last 5 digits of the serial number:

(a) Air evacuation flights— "AIR EVAC," "MARINE AIR EVAC," or "NAVY AIR EVAC."

87.c.(2)(a) Example.—
"AIR EVAC One Seven Six Five Two."

(b) Rescue flights—(Service name) "RESCUE."

87.c.(2)(b) Example.—
"Air Force RESCUE Six One Five Seven Niner."

(c) Military Airlift Command—"MAC."

87.c.(2)(c) Example.—
"MAC Seven Eight Five Six Two."

(d) Special Air Mission—"Sam."

87.c.(2)(d) Example.—
"SAM Niner One Five Six Two."

(e) USAF Contract Aircraft—"LOG-AIR."

87.c.(2)(e) Example.—

"LOGAIR Seven Five Eight Two Six."

(3) Military tactical and training:

(a) U.S. Air Force, Air National Guard, Military District of Washington priority aircraft, and USAF civil disturbance aircraft—Pronounceable words of 3, 4, 5 or 6 letters followed by a 4, 3, 2, or 1-digit number.

87.c.(3)(a) Examples.—

"Paul Two Zero."

"Pat One Five Seven."

"Gaydog Four."

87.c.(3)(a) Note.—When the "Z" suffix described in para. 161 is added to identify aircraft piloted by USAF undergraduate pilots, the call sign will be limited to a combination of six characters.

(b) Navy or Marine fleet and training command aircraft—The service name and 2 letters, or a digit and a letter (use letter phonetic equivalents), followed by 2 or 3 digits.

87.c.(3)(b) Examples.—

"Navy Golf Alpha Two One."

"Marine Four Charlie Two Three Six."

(c) NORAD interceptors—An assigned double letter 2-digit flight number.

87.c.(3)(c) Example.—

"Alpha Kilo One Five."

d. Foreign registry—State one of the following:

(1) Civil—The letters or digits of the aircraft registration or call sign.

87.d.(1) Example.—

"C-F-L-R-B."

(2) Air carrier—The abbreviated name of the operating company, followed by:

(a) The letters or digits of the registration or call sign.

87.d.(2)(a) Example.—

"Air France F-L-R-L-G."

(b) The flight number in group form.

87.d.(2)(b) Example.—

"Scandinavian Sixty-eight."

(3) Military—Except Canada, the name of the country and the military service followed by the separate digits or letters of the registration or call sign. Canadian Armed Force aircraft shall be identified by the word "CANFORCE" followed by the separate digits of the serial number, except that the Transport Command of the Canadian Armed Force shall be identified by the words "Canadian Military" and the Canadian Coast Guard shall be identified as "CANADIAN COAST GUARD" followed by the separate digits of the serial number.

87.d.(3) Examples.—

"CANFORCE Five Six Two Seven."

"Brazilian Air Force Five Three Two Seven Six."

e. Presidential aircraft and Presidential family aircraft:

(1) When the President is aboard a military aircraft, state the name of the military service, followed by the word "One."

87.e.(1) Examples.—

"Air Force One." "Army One." "Marine One."

(2) When the President is aboard a civil aircraft, state the words "Executive One."

(3) When a member of the President's family is aboard any aircraft, if the U.S. Secret Service or the White House Staff determines it is necessary, state the words "Executive One Foxtrot."

f. Vice Presidential aircraft:

(1) When the Vice President is aboard a military aircraft, state the name of the military service, followed by the word "Two."

87.f.(1) Examples.—

"Air Force Two." "Army Two." "Marine Two."

(2) When the Vice President is aboard a civil aircraft, state the words "Executive Two."

(3) When a member of the Vice President's family is aboard any aircraft, if the U.S. Secret Service or the White House Staff determines it is necessary, state the words "Executive Two Foxtrot."

g. Other special flights:

(1) Department of Energy flights—State the letters "RAC" (use phonetic alphabet equivalents) followed by the last 4 separate digits of the aircraft registration number.

87.g.(1) Example.—
"Romeo Alfa Charlie One Six Five Three."

(2) Semiautomatic Flight Inspections—State the code name "SAFI" followed by the separate digits of the grid number as filed.

87.g.(2) Example.—
"Denver Center, SAFI Five Two Seven."

(3) Flight Inspection of Navigational Aids—State the call sign "FLIGHT CHECK" followed by the digits of the registration number.

87.g.(3) Example.—
"Flight Check Three Niner Six Five Four."

(4) USAF aircraft engaged in aerial sampling missions—State the call sign "SAMP" followed by the last three digits of the serial number.

87.g.(4) Example.—
"SAMP Three One Six."

h. Use a pilot's name in identification of an aircraft only in special or emergency situations.

88. DESCRIPTION OF AIRCRAFT TYPES

Except as provided in **d.**, describe aircraft as follows when issuing traffic information.

a. Military:

(1) Military designator, with numbers spoken in group form, or

88.a.(1) Examples.—
"F-four." "B-fifty-eight."
"Air Force bomber." "Navy fighter."
"Fighter." "Bomber."

(2) Service and type, or

(3) Type only, if no confusion or misidentification is likely.

b. Air Carrier:

(1) Manufacturer's name or model.

(2) Add company name or other identifying features when confusion or misidentification is likely.

88.b. Examples.—
"Lockhead ten-eleven." "American seven-oh-seven." "United seven thirty-seven."

88.b. Note.—*TERMINAL:* Pilots of 'interchange' aircraft are expected to inform the tower on first radio contact the name of the operating company and trip number, followed by the company name as displayed on the aircraft, and aircraft type.

c. General Aviation and Air Taxi:

(1) Manufacturer's model, name or designator.

(2) Add color when considered advantageous.

88.c. Examples.—
"Tri-Pacer." "PA twenty-two."
"Cessna three ten." "Green Apache."

d. When issuing traffic information to aircraft cleared for a visual approach, specify the word "heavy" when you know the traffic is a heavy aircraft.

88.d. Examples.—
"Heavy C one forty-one."

89-99. RESERVED

Section 7. ROUTE AND NAVAID DESCRIPTION

→ 100. AIRWAYS AND ROUTES

Describe airways, route or jet routes as follows:

a. VOR/VORTAC/TACAN airways or jet routes—State the word "Victor" or the letter "J", followed by the number of the airway or route in group form. For RNAV routes add the word "Romeo."

100.a. Examples.—

"Victor Twelve." "J Five Thirty-three." "Victor Seven Ten Romeo." "J Eight Thirty Romeo." "Offset one zero miles right of J Eight Thirty Romeo."

b. VOR/VORTAC/TACAN alternative airways—State the word "Victor," followed by the number of the airway in group form and the alternative direction.

100.b. Example.—

"Victor Twelve South."

c. L/MF airways—State the color of the airway, followed by the number in group form.

100.c. Example.—

"Blue Eighty-one."

d. North American Route—State the words "North American Route" followed by the number of the route in group form.

100.d. Example.—

"North American Route Fifty."

e. MTRs—State the letters followed by the number of the route in group form.

100.e. Example.—

"IR Five Thirty-one."

101. NAVAID TERMS

Describe radials, arcs, courses, bearings and quadrants of NAVAIDs as follows:

a. VOR/VORTAC/TACAN NAVAIDs—State the name of the NAVAID, followed by the separate digits of the radial (omitting the word "degrees"), and the word "radial."

101.a. Example.—

"Appleton zero five zero radial."

b. Arcs about VOR-DME/VORTAC/TACAN NAVAIDs—State the distance in miles from the NAVAID, followed by the words "mile arc," the direction from the NAVAID in terms of the 8 principal points of the compass, the word "of," and the name of the NAVAID.

101.b. Example.—

"One five mile arc southwest of Grantsville."

c. Quadrant within a radius of NAVAID—State direction from NAVAID in terms of the quadrant, e.g., NE, SE, SW, NW, followed by the distance in miles from the NAVAID.

101.c. Example.—

"Cleared to fly northeast quadrant of Philipsburg VORTAC within four zero mile radius."

101.c. Reference—Route Use, 290.h. Glossary (Quadrant).

d. Nondirectional beacons—State the course to, or bearing from, the radio beacon, omitting the word "degree," followed by the words "course to" or "bearing from," the name of the radio beacon, and the words "radio beacon."

101.d. Example.—

"Three four zero bearing from Randolph Radio Beacon."

102. NAVAID FIXES

Describe fixes determined by reference to a radial/localizer and distance from a VORDME/VORTAC/TACAN/ILS-DME as follows:

a. When a fix is not named, state the name of the NAVAID, followed by a specified radial/localizer, and state the distance in miles followed by the phrase "mile fix".

102.a. Examples.—

"Appleton zero five zero radial three seven mile fix." "Reno localizer back course 4 mile fix."

b. When a fix is named, state the name of the fix, followed by the phrase "D-M-E fix" or "Waypoint" as appropriate.

102.b. Examples.—

"Shaum D-M-E fix." "Shaum Waypoint."

103. NAVAID MALFUNCTIONS

When an aircraft reports a NAVAID malfunction, take the following actions:

103. Note.—The sequence of the actions are not intended to circumvent good judgment, should the circumstances so dictate.

103. Reference.—7210.3—351, AT System Component Malfunctions.

a. Request a report from a second aircraft.

b. If the second aircraft reports normal operations, continue use and inform the first aircraft. Record the incident on FAA Form 7230–4 or appropriate Military Form.

c. If the second aircraft confirms the malfunction or in the absence of a second aircraft report, activate the standby equipment or request the monitor facility to activate.

d. If normal operation is reported after the standby equipment is activated, continue use, record the incident on FAA Form 7230–4 or appropriate Military Form, and notify Airway Facilities (AF) personnel (the Systems Engineer of the ARTCC when an en route aid is involved).

e. If continued malfunction is reported after the standby equipment is activated or the standby equipment cannot be activated, inform AF personnel and request advice on whether or not the aid should be shut down. In the absence of a second aircraft report, advise the AF personnel of the time of the initial aircraft report and the estimated time a second aircraft report could be obtained.

104–109. RESERVED

Section 8. ALTIMETER SETTINGS

110. CURRENT SETTINGS

a. Current altimeter settings shall be obtained from direct-reading instruments or directly from weather reporting stations.

110.a. **Note.**—The term 'current' does not apply to altimeter settings reported or received as estimated.

110.a. **Reference.**—7210.3, Chapter 2, Section 7.

b. If a pilot requests the altimeter setting in millibars, ask the nearest weather reporting station for the equivalent millibar setting.

111. ALTIMETER SETTING ISSUANCE BELOW LOWEST USABLE FL

a. *TERMINAL:* Identify the source of an altimeter setting when issued for a location other than the aircraft's departure or destination airport.

b. *EN ROUTE:* Identify the source of all altimeter settings when issued.

Phraseology:

THE (facility name) (time of report if more than one hour old) ALTIMETER (setting).

c. Issue the altimeter setting:

(1) To en route aircraft at least one time while operating in your area of jurisdiction. Issue the setting for the nearest reporting station along the aircraft's route of flight:

111.c.(1) **Note.**—FAR 91.81(1) requires that the pilot set his altimeter to a setting of a station along his route of flight within 100 miles of the aircraft if one is available. However, issuance of the setting of an adjacent station during periods that a steep gradient exists will serve to inform the pilot of the difference between the setting he is using and the pressure in the local area and better enable him to choose a more advantageous setting within the limitations of FAR 91.81.

(2) *TERMINAL:* To all departures. Unless specifically requested by the pilot, altimeter steeing need not be issued to local aircraft operators who have requested this omission in writing or to scheduled air carriers.

111.c.(2) **Reference.**—Departure Information, 980.

(3) *TERMINAL:* To arriving aircraft on initial contact or as soon as possible thereafter. The tower may omit the altimeter if the aircraft is sequenced or vectored to the airport by the approach control having jurisdiction at that facility.

111.c.(3) **Reference.**—Approach Information by Approach Control Facilities, 394.a. Approach Information, 1151.a.

(4) *EN ROUTE:* For the destination airport to arriving aircraft approximately 50 miles from destination if an approach control facility does not serve the airport.

d. If the altimeter setting must be obtained by the pilot of an arriving aircraft from another source, instruct the pilot to obtain the altimeter setting from that source.

111.d. **Note 1.**—Destination altimeter setting, whether from a local or remote source, is the setting upon which the instrument approach is predicated.

111.d. **Note 2.**—Approach charts for many locations specify the source of altimeter settings as non-FAA facilities, such as UNICOMs.

e. When issuing clearance to descend below the lowest usable flight level, advise the pilot of the altimeter setting of the weather reporting station nearest the point the aircraft will descend below that flight level.

f. USAF aircraft which will operate on "single altimeter settings" (FAR Exemption 2082 Operations) shall be issued altimeter setings in accord with standard procedures while the aircraft are enroute to and from their ATC Assigned Airspace Areas.

111.f. **Reference.**—7210.3—661.

112-119. RESERVED

Section 9. FLIGHT PLANS AND CONTROL INFORMATION

120. RECORDING INFORMATION

a. Record domestic flight plans on flight plan forms or flight progress strips. Enter information required by the type of flight plan, existing circumstances, and future communications since all items are not necessary in each instance and not all entered will be transmitted when the flight plan is processed. Use authorized abbreviations when possible. When accepting flight plans for random RNAV routes, ensure that the route is defined by waypoints in terms of degree-distance fixes.

120. Note.—Generally, all military overseas flights are required to clear through a specified military base operations office (BASOPS). Pilots normally will not file flight plans directly with an FAA facility unless a BASOPS is not available. BASOPS will in turn forward the IFR flight notification message to the appropriate center.

120. Reference.—Flight Plan Record, Appendix 2.

b. *EN ROUTE:* When flight plans are filed directly with the center, record all items given by the pilot either on a flight progress strip or on voice recorder. If the latter, enter in box 26 of the initial flight progress strip the sector or position number to identify where the information may be found in the event SAR activities become necessary.

121. FORWARDING INFORMATION

a. Except during Stage A operation, forward the flight plan information to the appropriate ATC facility, FSS, or BASOPS and record the time of filing and delivery on the form.

b. *EN ROUTE:* During Stage A operations, the above manual actions are required in cases where the data is not forwarded automatically by the computer.

121.b. Note.—During Stage A operation, data are exchanged between interfaced automated facilities and both the data and time of transmission are recorded automatically.

c. *EN ROUTE:* Forward proposed tower en route flight plans and any related amendments to the appropriate departure terminal facility.

122. FORWARDING VFR DATA

TERMINAL

Forward aircraft departure times to FSSs or military operations offices when they have requested them. Forward other VFR flight plan data only if requested by the pilot.

123. IFR TO VFR FLIGHT PLAN CHANGE

Request a pilot to contact the appropriate FSS if he informs you of a desire to change from an IFR to a VFR flight plan.

→ 124. IFR FLIGHT PROGRESS DATA

Forward control information from controller to controller within a facility, then to the receiving facility as the aircraft progresses along its route. Where appropriate, use computer equipment in lieu of manual coordination procedures. Ensure that flight plan and control information is correct and up-to-date. The procedures for preparing flight plan and control information related to altitude reservations (ALTRVs) are contained in 7210.3—1001. Development of the methods of assuring the accuracy and completeness of ALTRV flight plan and control information is the responsibility of the Military Liaison and Security Officer. When covered by a Letter of Agreement/Facility Directive, the time requirements of **b.**(1) and **132.a.** may be increased up to 15 minutes when facilitated by automated systems or mandatory radar handoffs; or if operationally necessary because of manual data processing or nonradar operations, the time requirements of **a.** may be increased.

124. Note.—The term facility in this paragraph is defined as centers and terminal facilities when operating in an enroute capacity.

a. Forward the following information at least 15 minutes before the aircraft is estimated to enter the receiving facility's area:

(1) Aircraft identification.

(2) Heavy aircraft indicator "H" (if appropriate), type of aircraft and appropriate suffix if transponder, DME, RNAV, or TACAN-only equipped.

(3) Assigned altitude and ETA over last reporting point/fix in transferring facility's area or assumed departure time when the departure point is the last point/fix in the transferring facility's area.

(4) Altitude at which aircraft will enter the receiving facility's area if other than the assigned altitude.

(5) True airspeed.

(6) Point of departure.

(7) Route of flight remaining.

(8) Destination airport and clearance limit if other than destination airport.

(9) ETA at destination airport (not required for military or scheduled air carrier aircraft).

(10) Altitude requested by the aircraft if assigned altitude differs from requested altitude (within a facility only).

124.a.(10) Note.—When an aircraft has crossed one facility's area and assignment at a different altitude is still desired, the pilot will reinitiate his request with the next facility.

124.a.(10) Reference.—Anticipated Altitude Changes, 235.

(11) When flight plan data must be forwarded manually and an aircraft has been assigned a beacon code by the computer, include the code as part of the flight plan.

(12) Longitudinal separation being used between aircraft at the same altitude if it results in these aircraft having less than 10 minutes separation at the facilities' boundary.

(13) Any additional non-routine operational information pertinent to flight safety.

124.a.(13) Note.—*EN ROUTE:* This includes alerting the receiving controller that the flight is conducting celestial navigation training.

124.a.(13) Reference.—*EN ROUTE:* Celestial Navigation Training, 1510.

b. Forward position report over last reporting point in the transferring facility's area if any of the following conditions exist:

(1) Time differs more than 3 minutes from estimate given.

(2) Requested by receiving facility.

(3) Agreed to between facilities.

125. ALTRV INFORMATION

EN ROUTE

When an aircraft is a part of an approved ALTRV, forward only those items necessary to properly identify the flight, update flight data contained in the ALTRV APVL, or revise previously given information.

126-129. RESERVED

130. COMPUTER MESSAGE VERIFICATION

EN ROUTE

Unless your facility is equipped to automatically obtain acknowledgment of receipt of transferred data, when you transfer control information by computer message obtain, via Service F, acknowledgment that the receiving center has received the message and verification of the following:

a. Within the time limits specified by Letter of Agreement or when not covered by Letter of Agreement, at least 15 minutes before the aircraft is estimated to enter the receiving facility's area or at the time of a radar handoff or coordination for transfer of control:

(1) Aircraft identification.

(2) Assigned altitude.

(3) Departure or coordination fix time.

b. Any cancellation of IFR flight plan.

131. TRANSMIT PROPOSED FLIGHT PLAN

EN ROUTE

a. Transmit proposed flight plans which fall within an ARTCCs Proposed Boundary Crossing Time (PBCT) parameter to adjacent ARTCCs via the Computer B network during hours of inter-center computer operation. In addition, when the route of flight of any proposed flight plan exceeds 20 elements external to the originating ARTCCs area, Center B shall be used to forward the data to all affected centers.

b. During nonautomated operation, the proposed flight plans shall be sent via Center B to the other centers involved when any of the following conditions are met:

(1) The route of flight external to the originating center's area consists of 10 or more elements and the flight will enter 3 or more other center areas.

131.b.(1) Note.—An element is defined as either a fix or route as specified in 7110.80-156.

(2) The route of flight beyond the first exit from the originating center's area consists

of 10 or more elements, which are primarily fixes described in fix-radial-distance or latitude/longitude format, regardless of the number of other center areas entered.

(3) The flight plan remarks are too lengthy for interphone transmission.

132. FORWARDING AMENDED AND UTM DATA

a. Forward any amending data concerning previously forwarded flight plans except that revisions to ETA information in **124.a.**(3) need only be forwarded when the time differs by more than 3 minutes from the estimate given.

Phraseology:

(Ident), REVISED (revised information).

132.a. Examples.—"American Two, revised flight level, three three zero." "United Eight Ten, revised estimate, Front Royal two zero zero five." "Douglas Five Zero One Romeo, revised altitude, eight thousand." "Eastern Four Thirty-six, revised type, heavy DC-8."

b. Computer acceptance of an appropriate input message fulfills the requirement for sending amended data. The amendment data are considered acknowledged upon receipt of a CRD update message or a computer generated flight progress strip containing the amendment data.

132.b. Note 1.—The successful utilization of automation equipment requires timely and accurate insertion of changes and/or new data.

132.b. Note 2.—If a pilot is not issued a computer generated PDR/PDAR/PAR and amendment data are not entered into the computer, the next controller will have incorrect route information.

c. Forward any amending control information and record the action on the appropriate flight progress strip.

d. *EN ROUTE:* During Stage A operation, effect manual coordination on an initial interfacility flight plan message and on any subsequent messages related to that flight plan under the following conditions:

(1) When a red coordination indicator is printed on the coordination strip.

(2) When a black coordinator indicator is printed on the coordination strip and an Unsatisfactory Transmission Message (UTM) referencing that flight plan is received at the coordination sector. Draw a line through the computer coordination indicator and indicate when manual coordination has been effected.

(3) When the transmission of the initial flight plan message is successful and a UTM is received containing revised data.

133. AIRBORNE MILITARY FLIGHTS

Forward to FSSs the following information received from airborne military aircraft:

a. IFR flight plans.

b. Changes to IFR flight plan as follows:

(1) Change in destination.

(2) Revised ETA.

(3) Change in fuel exhaustion time.

133. Note.—This makes current information available to FSSs for relay to military bases concerned and for use by centers in the event of two-way radio communication failure.

134. FORWARDING FLIGHT PLAN DATA BETWEEN U.S. ARTCCs AND CANADIAN ACCs

EN ROUTE

a. *Domestic*—(Continental U.S./Canadian Airspace except Alaska) Proposed departure flight plans and en route estimates will be handled on a 30 minute lead time (or as bilaterally agreed) between any ACC or ARTCC.

b. *International*—Any route changes (except SIDs) must be forwarded to the appropriate Oceanic/Pre-oceanic ACC or ARTCC with an optimum lead time of 30 minutes or as soon as this information becomes available.

c. Initially, if a flight goes from U.S. airspace into Canadian airspace and returns to U.S. airspace, the ACC will be responsible for forwarding the flight plan data to appropriate ARTCC by voice transmission except for flights which traverse mutually agreed airways/fixes. These airways/fixes will be determined on a case-by-case basis, and will be based on time and distance considerations at the Regional level.

135-149. RESERVED

Section 10. FLIGHT PROGRESS STRIPS

150. GENERAL

Use flight progress strips to post current data on air traffic and clearances required for control and other air traffic control services. To prevent misinterpretation when data is hand printed use standard hand printed characters.

150. Note.—Unused flight progress strips, made available because of the design of strip printers whereby several blank strips are ejected to reach the first printed strip, should be saved and used for manual strip preparation.

a. Enter on the appropriate strip without delay the estimated times, clearance information, position reports, and any other IFR flight data received over any communications channel.

b. Maintain only necessary current data and remove the strips from the flight progress boards when no longer required for control purposes. To correct, update or preplan information:

(1) Do not erase or overwrite any item. Use an "X" to delete a climb/descend and maintain arrow and to delete unwanted altitude information. Write the new altitude information immediately adjacent to it and within the same space. For other items, draw a horizontal line through it and write the new item immediately adjacent to it and within the same space.

(2) Do not draw a horizontal line through an altitude being vacated until after the aircraft has reported or is observed (valid Mode C) leaving the altitude.

(3) *EN ROUTE:* Preplanning may be accomplished in red pencil.

c. Enter the time of arrival (at approach control locations, the time over release point) for aircraft landing within your sector jurisdiction as follows:

(1) *EN ROUTE:* Within controlled airspace—On the appropriate fix strip.

(2) *EN ROUTE:* Outside of controlled airspace but within flight advisory area—On the strip of the fix nearest the point of landing.

d. Manually prepared strips shall conform to the format of machine generated strips and manual strip preparation procedures will be modified simultaneously with the operational implementation of changes in the machine generated format.

151. ARRANGEMENT OF POSTINGS

EN ROUTE

Arrange flight progress strips under the appropriate fix designators in the following manner:

a. Post in the appropriate low or high altitude sector according to the assigned altitude or flight level.

b. Sequence in chronological order of arrival over a particular fix (time sequencing) or in ascending order of assigned altitudes over a holding fix (altitude sequencing).

c. Post arrival aircraft in time sequence below the departure aircraft when displayed under the same fix designator or sequence arrivals and departures together if considered more appropriate for a given fix. Arrival aircraft and departure aircraft may be displayed in two different bays.

152. DATA ENTRIES

EN ROUTE

a. Enter the information specified below in the correspondingly numbered spaces of the flight progress strips (FAA Forms 566.4.1/7230-19 or 566.5/7230-20):

(1) Verification symbol, if required.

(2) Revision number.

(3) Aircraft identification.

(4) Number of aircraft (if more than one), heavy aircraft indicator "H/" (if appropriate), type of aircraft and special equipment indicators.

(5) Filed true airspeed.

(6) Sector number.

(7) Computer identification number, if required.

(8) Estimated groundspeed.

(9) Revised groundspeed or strip request (SR) originator.

(10) Strip number.

(11) Previous fix.

(12) Estimated time over previous fix.

(13) Revised estimated time over previous fix.

(14) Actual time over previous fix or actual departure time entered on first fix posting after departure.

(14a) Plus time expressed in minutes from the previous fix to the posted fix.

(15) Center-estimated time over fix (in hours and minutes) or clearance information for departing aircraft.

(16) Arrows to indicate if aircraft is departing (↑) or arriving (↓).

(17) Pilot-estimated time over fix.

(18) Actual time over fix, time leaving holding fix, arrival time at nonapproach control airport, or symbol indicating cancellation of IFR flight plan for arriving aircraft or departure time (actual or assumed).

(19) Fix. For departing aircraft, add proposed departure time.

(20) Altitude (in hundreds of feet) information.

(21) Next fix.

(22) Pilot's estimated time over next fix.

(23) Arrows to indicate north (↑), south (↓), east (→), or west (←) direction of flight, if required.

(24) Requested altitude.

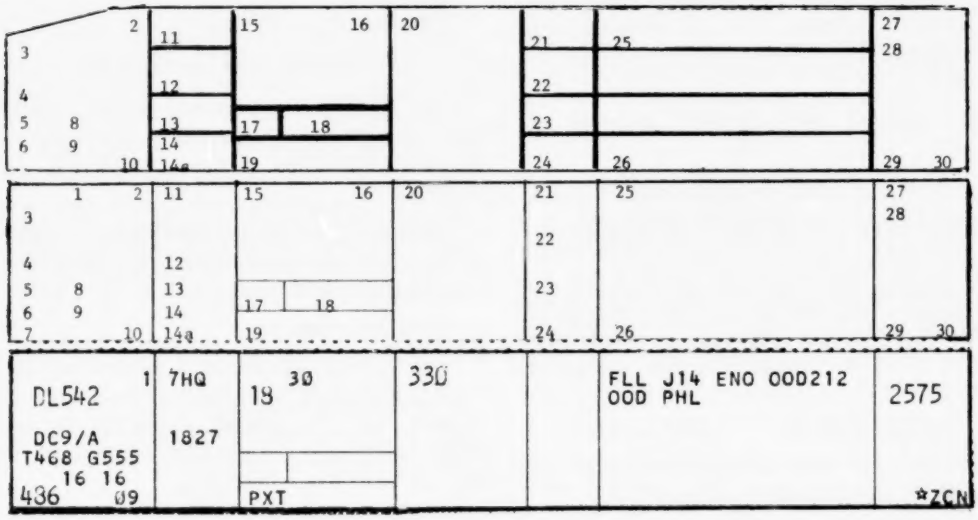
(25) Point of origin, route as required for control and data relay, and destination.

(26) Pertinent remarks or sector or position number when applicable in accordance with **120.b.**

(27) Mode 3/A beacon code (if applicable).

(28) Miscellaneous control data (expected approach clearance time, expected further clearance time, time cleared for approach, etc.).

(29–30) Transfer of control data and coordination indicators.



152. Illustration

153-155. RESERVED

156. DATA ENTRIES

TERMINAL

Enter the information specified below in the correspondingly numbered spaces of the flight progress strips (FAA Forms 7230-7.1, 7230-7.2 and 7230-8):

156. **Note 1.**—National standardization of items (10 through 18) is not practical because of regional and local variations in operating methods, e.g., single fix, multiple fix, radar, tower en route control, etc.

156. **Note 2.**—Facility chiefs at FDEP locations may authorize reduced lateral spacing between fields so as to print all FDEP data to the left of the strip perforation when using FAA Form 7230-7.2. All items will retain the same relationship to each other as they do when the full length strip (FAA Form 7230-7.1) is used.

a. Arrivals:

(1) Aircraft identification.

(2) Revision number (FDEP locations only).

(2A) Strip request originator. (At FDEP locations this indicates the sector or position that requested a strip be printed.)

(3) Number of aircraft (if more than one), heavy aircraft indicator "H/" (if appropriate), type of aircraft and suffix indicating any special equipment.

(4) Computer identification number, if required.

(5) Secondary radar (beacon) code assigned.

(6) Previous fix (FDEP locations) or inbound airway.

156.a.(6). Note.—The previous fix will be printed at FDEP locations. Use of the inbound airway is restricted to facilities where flight data is received via interphone when agreed upon by the center and terminal facilities.

(7) Coordination fix.

(8) Estimated time of arrival at the coordination fix or destination airport.

(9) Altitude (in hundreds of feet) and remarks.

(9A) Destination airport.

156.a.(9A) Note.—Facility chiefs may permit this information to be omitted if no misunderstanding will result. This shall be specified in the Facility Directive concerning strip marking procedures.

(10 through 18) Enter data as specified by Facility Directive. Radar facility personnel need not enter data in these spaces except when nonradar procedures are used or when radio recording equipment is inoperative.

b. Departures:

(1) Aircraft identification.

(2) Revision number (FDEP locations only).

(2A) Strip request originator. (At FDEP locations this indicates the sector or position that requested a strip be printed.)

(3) Number of aircraft (if more than one), heavy aircraft indicator "H/" (if appropriate), type of aircraft and suffix indicating any special equipment.

(4) Computer identification number, if required.

(5) Secondary radar (beacon) code assigned.

(6) Proposed departure time.

(7) Requested altitude.

(8) Departure airport.

156.b.(6, 7, 8) Reference.—See 156.a.(9A) Note.

(9) Machine generated—Route, destination and remarks. Manually enter altitude/altitude restrictions in the order flown, if appropriate.

Manually prepared—Clearance limit, route, altitude/altitude restrictions in the order flown, if appropriate and remarks.

(9A) Not used.

(10 through 18) Enter data as specified by Facility Directive. Items such as departure time, runway used for takeoff, check marks to indicate information forwarded or relayed, may be entered in these spaces.

c. Overflights:

(1) Aircraft identification.

Section 4. ALTITUDE ASSIGNMENT

230. FLIGHT DIRECTION

Except as specified in **1801.**, clear aircraft at altitudes according to the **Table.**

230. Table.—Altitude Assignment

Aircraft operating	*On course degrees magnetic*	*Assign*
Below 3,000 feet above surface.	Any course.	Any altitude,
Below FL 290.	0 through 179.	Odd cardinal altitudes or flight levels at intervals of 2,000 feet.
	180 through 359.	Even cardinal altitudes or flight levels at intervals of 2,000 feet.
At or above FL 290.	0 through 179.	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 290.
	180 through 359.	Odd cardinal flight levels at intervals of 4,000 feet beginning with FL 310.
Within an ALTRV.	Any course.	Any altitude or flight level.

230. Examples.—

3,000, 5,000, FL 250, FL 270.
4,000, 6,000, FL 240, FL 260.
FL 290, FL 330, FL 370.
FL 310, FL 350, FL 390.

230. Reference.—Altitude Assignment, 1801.

→ 231. EXCEPTIONS

When traffic, meteorological conditions, or aircraft operational limitations prevent assignment of altitudes prescribed in **230.**, assign any cardinal altitude or flight level below FL 290 or any odd cardinal flight level at or above FL 290 without regard to direction of flight as follows:

231. Note.—See **Appendix 1** for control abbreviations and symbols to be used in conjunction with this paragraph.

a. For traffic conditions, take this action only if one of the following conditions exists:

(1) Aircraft remain within a facility's area and prior approval is obtained from other affected positions or sectors or the operations are covered in a Facility Directive.

(2) Aircraft will proceed beyond the facility's area and specific operations and procedures permitting random altitude assignment are covered in a Letter of Agreement between the appropriate facilities.

(3) Military aircraft are operating on random routes and prior approval is obtained from the facility concerned.

b. For meteorological conditions, take this action only if you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

c. For aircraft operational limitations, take this action only if the pilot informs you the available appropriate altitude exceeds the operational limitations of his aircraft and only after you obtain prior approval from other affected positions or sectors within your facility and, if necessary, from the adjacent facility concerned.

d. For mission requirements, take this action only when the aircraft is operating on an MTR.

232. LOWEST USABLE FLIGHT LEVEL

If a change in atmospheric pressure affects a usable flight level in your area of jurisdiction, use the **Table** to determine the lowest usable flight level to clear aircraft at or above 18,000 feet msl.

232. Table.—Lowest Usable FL

Altimeter Setting	*Lowest Usable FL*
29.92″ or higher	180
29.91″ to 28.92″	190
28.91″ to 27.92″	200

233. ALTITUDE INFORMATION

When issuing altitude information, include the following items, as appropriate:

233. Reference.—Clearance Items, 190.

a. Altitude to maintain or cruise. When issuing cruise in conjunction with an airport clearance limit and an unpublished route will be used, issue an appropriate crossing altitude to ensure terrain clearance until the aircraft reaches a fix, point or route where the altitude information is available to the pilot.

233.a. Note.—The crossing altitude must assure IFR obstruction clearance to the point where the aircraft is established on a segment of a published route or instrument approach procedure.

Phraseology:

MAINTAIN/CRUISE (altitude).

MAINTAIN (altitude) UNTIL (time)

or

PAST (fix)

or

(number of miles or minutes) MILES/MINUTES PAST (fix).

CROSS (fix, point) OR INTERCEPT (route) AT OR ABOVE (altitude), CRUISE (altitude).

b. Instructions to climb or descend, including restrictions, as required.

233.b. Reference.—Combining speed reduction with decent clearance, 821.b.

Phraseology:

CLIMB/DESCEND AND MAINTAIN (altitude).

If required

AFTER PASSING (fix)

or

AT (time).

CLIMB/DESCEND AND MAINTAIN (altitude) WHEN ESTABLISHED AT LEAST (number of miles or minutes) MILES/MINUTES PAST (fix) ON THE (navaid) (specified) RADIAL.

CLIMB/DESCEND TO REACH (altitude) AT (time or fix)

or

A POINT (number of miles) MILES (direction) OF OF (name of DME navaid).

c. Specified altitude over a specified fix.

Phraseology:

CROSS (fix) AT (altitude).

CROSS (fix) AT OR ABOVE/BELOW (altitude).

d. A specified altitude over a specified fix for that portion of a descent clearance where descent at pilot's discretion is permissible. At any other time it is practicable, authorize climb/descent at pilot's discretion.

Phraseology:

CLIMB/DESCEND AT PILOT'S DISCRETION.

233.d. Example 1.—

"United Four Seventeen, descend and maintain six thousand."

The pilot is expected to commence descent upon receipt of the clearance and to descend at the suggested rates specified in AIM, ATC Clearances/Separations, (Adherence to Clearance, Paragraph 270) until reaching the assigned altitude of 6,000 feet.

233.d. Example 2.—

"United Four Seventeen, descend at pilot's discretion, maintain six thousand."

The pilot is authorized to conduct descent within the context of the term "at pilot's discretion" as described in the AIM.

233.d. Example 3.—

"United Four Seventeen cross Lakeview V–O–R at or above flight level two zero zero, descend and maintain six thousand."

The pilot is authorized to conduct descent "at pilot's discretion", until reaching Lakeview VOR. He/she must comply with the clearance provision to cross the Lakeview VOR at or above FL 200, and after passing Lakeview VOR, he/she is expected to descend at the rates specified in the AIM until reaching the assigned altitude of 6,000 feet.

233.d. Example 4.—

"United Four Seventeen, cross Lakeview V-O-R at and maintain six thousand.

The pilot is authorized to conduct descent "at pilot's discretion." but he/she must comply with the clearance provision to cross Lakeview VOR at 6,000 feet.

233.d. Example 5.—

"United Four Seventeen, descend now to flight level two seven zero, cross Lakeview V-O-R at or below one zero thousand, descend and maintain six thousand."

The pilot is expected to promptly execute and complete descent to FL 270 upon receipt of the clearance. After reaching FL 270, he/she is authorized to descend "at pilot's discretion" until reaching Lakeview VOR. He/she must comply with the clearance provision to cross Lakeview VOR at or below 10,000 feet. After Lakeview VOR, he/she is expected to descend at the rates specified in the AIM until reaching 6,000 feet.

233.d. **Note.**—A descent clearance which specifies a crossing altitude authorizes descent at pilot's discretion for that portion of the flight to which the crossing altitude restriction applies. Any other time that authorization to descend at pilot's discretion is intended it must be specifically stated by the controller.

233.d. **Reference.**—Glossary (Pilot's Discretion).

e. Altitude assignments involving more than one altitude.

Phraseology:

MAINTAIN (altitude) THROUGH (altitude).

234. COMPUTER ENTRY OF ASSIGNED ALTITUDE

EN ROUTE

The data block shall always reflect the current status of the aircraft, unless otherwise specified in a facility directive. Whenever an aircraft is cleared to maintain an altitude different from that in the flight plan data base, enter into the computer one of the following:

234. **Note.**—A facility directive may be published deleting the interim altitude computer entry requirements of 234.b. The directive would apply to those conditions where heavy traffic or sector complexity preclude meeting these entry requirements.

234. **Reference.**—7210.3—1025, Waiver of Interim Altitude Requirements.

a. The new assigned altitude if the aircraft will (climb or descend to and) maintain the new altitude, or

b. An interim altitude if the aircraft will (climb or descend to and) maintain the new altitude for a short period of time and subsequently be recleared to the altitude in the flight plan data base or a new altitude or a new interim altitude.

234.b. **Note.**—Use of the interim altitude function will ensure that the data block reflects the actual status of the aircraft and eliminate superfluous altitude updates.

235. ANTICIPATED ALTITUDE CHANGES

If practicable, inform an aircraft when to expect climb or descent clearance or to request altitude change from another facility.

Phraseology:

EXPECT CLIMB/DESCENT CLEARANCE IN (number of miles or minutes) MILES/MINUTES

or

AT (fix).

REQUEST ALTITUDE CHANGE FROM (name of facility).

If required

AT (time, fix, or altitude).

236. MINIMUM EN ROUTE ALTITUDES

Except as provided in **a.** and **b.** below, assign altitudes at or above the MEA for the route segment being flown. When a lower MEA for subsequent segments of the route is applicable, issue the lower MEA only after the aircraft is over or past the Fix/NAVAID beyond which the lower MEA applies unless a crossing restriction at or above the higher MEA is issued.

a. An aircraft may be cleared below the MEA but not below the MOCA for the route segment being flown if the altitude assigned is at least 300 feet above the floor of controlled airspace and one of the following conditions are met:

236.a. **Note.**—Controllers must be aware that in the event of radio communications failure, a pilot will climb to the MEA for the route segment being flown.

(1) Nonradar procedures are used only within 22 miles of a VOR, VORTAC, or TACAN.

(2) Radar procedures are used only when an operational advantage is realized and the following actions are taken:

(a) Radar navigational guidance is provided until the aircraft is within 22 miles of the NAVAID, and

(b) Lost communications instructions are issued.

b. An aircraft may be cleared to operate on jet routes below the MEA (but not below the prescribed minimum altitude for IFR opera-

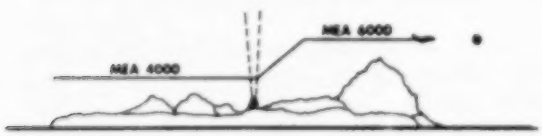
tions) or above the maximum authorized altitude if, in either case, radar service is provided.

236.b. Note.—Minimum en route and maximum authorized altitudes for certain jet route segments have been established above the floor of the jet route structure due to limitations on navigational signal coverage.

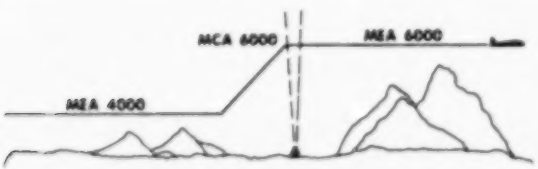
c. Where a higher altitude is required because of an MEA, the aircraft shall be cleared to begin climb to the higher MEA as follows:

(1) If no MCA is specified, prior to or immediately after passing the fix where the higher MEA is designated.

(2) If a MCA is specified, prior to the fix so as to cross the fix at or above the MCA.



236.c. Illustration 1.



236.c. Illustration 2.

d. Where MEA's have not been established, clear an aircraft at or above the minimum altitude for IFR operations prescribed by FAR 91.119.

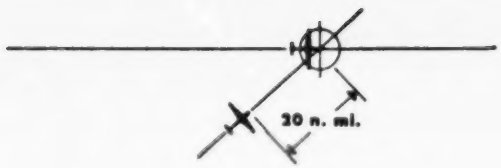
237. ADJUSTED MINIMUM FLIGHT LEVEL

When the prescribed minimum altitude for IFR operations is at or above 18,000 feet msl, and the atmospheric pressure is less than 29.92″, add the appropriate adjustment factor from the **Table** to the flight level equivalent of the minimum altitude in feet to determine the adjusted minimum flight level.

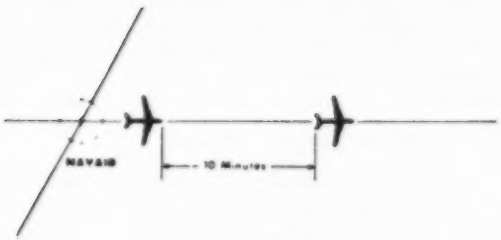
237. Table.—Minimum FL Adjustment

Altimeter Setting	*Adjustment Factor*
29.92″ or higher	None
29.91″ to 29.42″	500 feet
29.41″ to 28.92″	1,000 feet
28.91″ to 28.42″	1,500 feet
28.41″ to 27.92″	2,000 feet

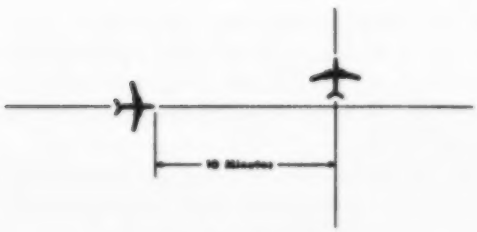
238-249. RESERVED



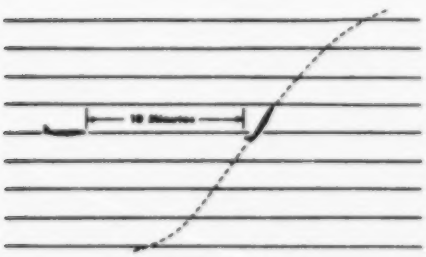
271.d. Illustration 2.



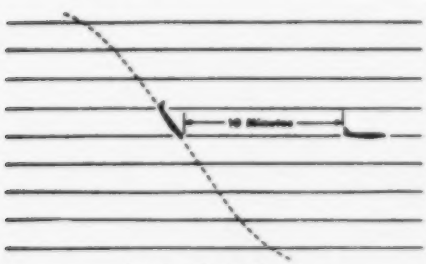
271.d. Illustration 3.



271.d. Illustration 4.



271.d. Illustration 5.

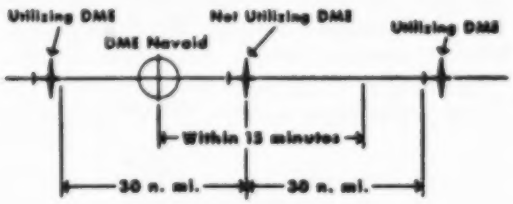


271.d. Illustration 6.

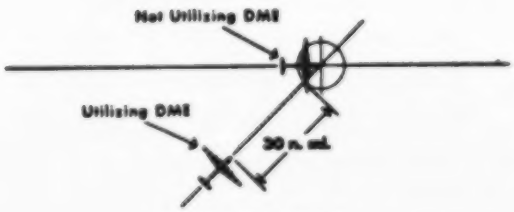
e. Between aircraft, when one aircraft is using DME and the other is not—*30 miles* if both the following conditions are met:

(1) The aircraft using DME derives distance information by reference to the same NAVAID over which the aircraft not using DME has reported.

(2) The aircraft not using DME is within 15 minutes of the NAVAID.



271.e. Illustration 1.

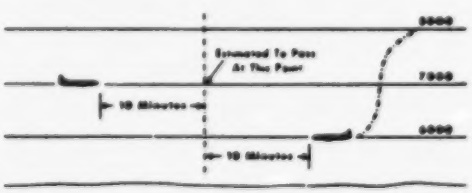


271.e. Illustration 2.

f. Between aircraft when one aircraft is using RNAV and the other is using neither DME nor RNAV—*30 miles.*

272. MINIMA ON OPPOSITE COURSES

Separate aircraft traveling opposite courses by assigning different altitudes consistent with the approved vertical separation from *10 minutes* before, until *10 minutes* after they are estimated to pass. Vertical separation may be discontinued after one of the following conditions is met:

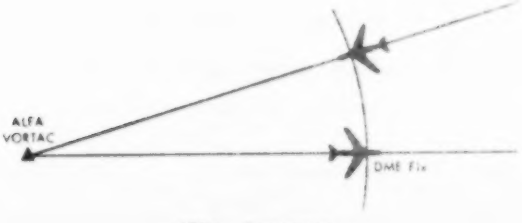


272. Illustration.

272. Note.—RNAV route segments that have been expanded in the proximity to reference facilities for slant range effect are not to be considered "expanded" for purposes of applying separation criteria in this paragraph.

a. Both aircraft have reported passing NAVAIDs or DME fixes indicating they have passed each other.

272.a. Note.—It is not intended to limit application of this procedure only to aircraft operating in opposite directions along the same airway or radial. This procedure may also be applied to aircraft established on diverging airways or radials of the same NAVAID.



272.a. Illustration.

b. Both aircraft have reported passing the same intersection and they are at least *3 minutes* apart.

c. Two RNAV aircraft have reported passing the same position and are at least *8 miles* apart if operating along a route that is 8 miles or less in width; or *18 miles* apart if operating along an expanded route; except that *30 miles* shall be applied if operating along that portion of any route segment defined by a navigation station requiring extended usable distance limitations beyond 130 miles.

d. An aircraft utilizing RNAV and an aircraft utilizing VOR have reported passing the same position and the RNAV aircraft is at least *4 miles* beyond the reported position when operating along a route that is 8 miles or less in width; *9 miles* beyond the point when operating along an expanded route; except that *15 miles* shall be applied if operating along that portion of any route segment defined by a navigation station requiring extended usable distance limitation beyond 130 miles; or *3 minutes* apart whichever is greater.

273. SEPARATION BY PILOTS

When pilots of aircraft on the same course in direct radio communication with each other concur, you may authorize the following aircraft to maintain longitudinal separation of *10 minutes;* or *20 miles* if they are using DME.

Phraseology:
MAINTAIN AT LEAST ONE ZERO MINUTES/TWO ZERO MILES SEPARATION FROM (Ident).

274. RNAV AIRCRAFT ALONG VOR AIRWAYS/ROUTES

Advise the pilot to use DME distances when applying DME separation to an RNAV aircraft operating along VOR airways/routes.

Phraseology:
USE DME DISTANCES.

274. Note.—*Along track distance* derived from area navigation devices having slant range correction will not coincide with the direct DME readout.

275-279. RESERVED

Section 7. LATERAL SEPARATION

280. SEPARATION METHODS

Separate aircraft by one of the following methods:

a. Clear aircraft on different airways or routes whose widths or protected airspace do not overlap.

280.a. Note.—Airspace protected for airways is based on airway widths described in FAR 71.5 and airspace protected for routes will be consistent with those widths. Airspace to be protected for RNAV routes, including SIDs and STARS, is defined in Handbook 7110.18.

b. Clear aircraft below 18,000 to proceed to and report over or hold at different geographical locations determined visually or by reference to NAVAIDs.

c. Clear aircraft to hold over different fixes whose holding pattern airspace areas do not overlap each other or other airspace to be protected.

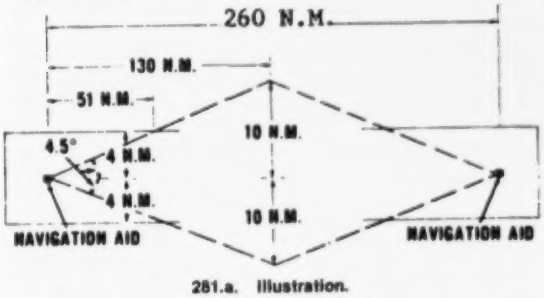
d. Clear departing aircraft to fly specified headings which diverge by at least 45 degrees.

281. MINIMA ALONG OTHER THAN ESTABLISHED AIRWAYS OR ROUTES

Protect airspace along other than established airways or routes as follows:

281. Reference.—Glossary (Airway, Route).

a. Direct courses and course changes of 15 degrees or less:



281.a. Illustration.

(1) Via NAVAIDs or radials FL 600 and below—*4 miles* on each side of the route to a point 51 miles from the NAVAID, then increasing in width on a 4½ degree angle to a width of *10 miles* on each side of the route at a distance of 130 miles from the NAVAID.

(2) Via degree-distance fixes for aircraft authorized under **297.**

(a) Below FL 180—*4 miles* on each side of the route.

(b) FL 180 to FL 600 inclusive—*10 miles* on each side of the route.

(3) Via degree-distance fixes for RNAV flights above FL 450—*10 miles* on each side of the route.

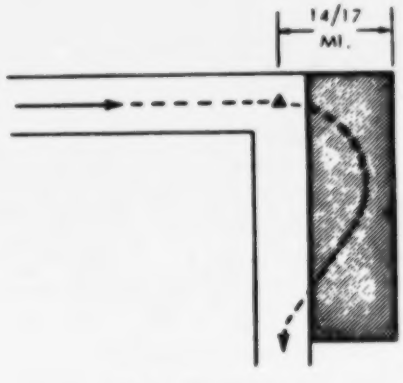
281.a.(3). Note.—Degree-distance RNAV flight (random routes) at FL 450 and below are provided radar separation.

b. When course change is 16 degrees through 90 degrees, protect the airspace on the overflown side, beginning at the point where the course changes, as follows:

(1) Below FL 180—same as **a.**(1) or (2).

(2) FL 180 to FL 230 inclusive—*14 miles.*

(3) Above FL 230 to FL 600 inclusive—*17 miles.*



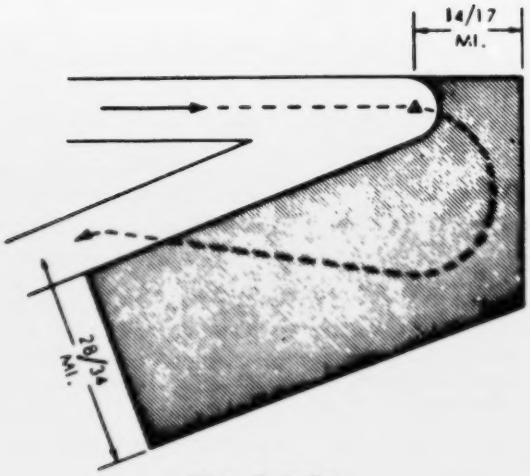
281.b. Illustration.

c. When course change is 91 degrees through 180 degrees, protect the airspace on the overflown side, beginning at the point where the course changes, as follows:

(1) Below FL 180—same as **a.**(1) or (2).

(2) FL 180 to FL 230 inclusive—*28 miles.*

(3) Above FL 230 to FL 600 inclusive—*34 miles.*

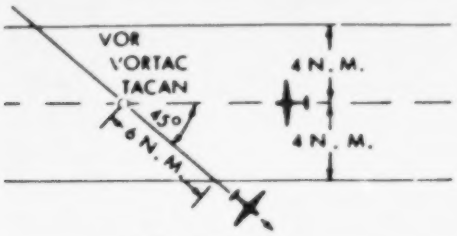


281.c. Illustration.

d. After the course changes specified in **b.** or **c.** have been completed and the aircraft is back on course, the appropriate minima in **a.** may be used.

282. MINIMA ON DIVERGING RADIALS

a. Consider separation to exist between aircraft established on radials of the same navaid that diverge by at least 15 degrees when either aircraft clear of the airspace to be protected for the other aircraft.



282.a. Illustration.

282.a. Note.—The procedure may be applied to converging as well as diverging aircraft. For example, the aircraft depicted 6 miles from the NAVAID in Illustration 282.a. would require vertical separation until reaching the 6 mile point. Reversing direction, the same aircraft would require vertical separation before passing the 6 mile point.

b. Use the **Table** to determine the flight distance required for various divergence angles to clear the airspace to be protected. For divergence that falls between two values, use the lesser divergence value to obtain the distance.

282.b. Table.—Divergence-Distance Minima

Divergence (degrees)	*Distance (NM)*
15	16
20	12
25	10
30	8
35	7
45	6
55	5
90	4

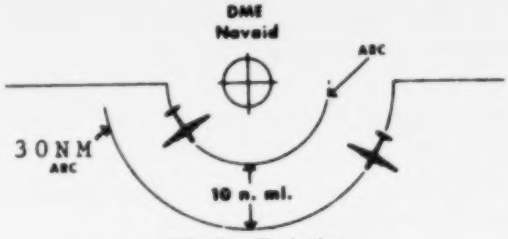
283. DME ARC MINIMA

Apply lateral DME separation by requiring aircraft using DME to fly an arc about a NAVAID at a specified distance, using the following minima:

283. Reference.—NAVAID Terms, 101.

a. Between different arcs about a NAVAID regardless of direction of flight:

(1) At 35 miles or less from the NAVAID—*10 miles.*



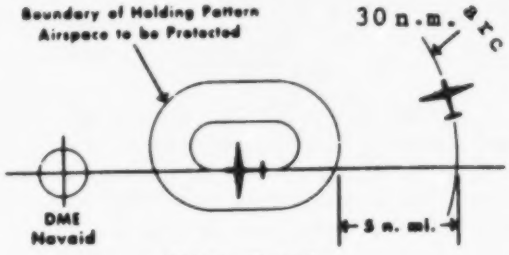
283.a.(1). Illustration.

(2) More than 35 miles from the NAVAID—*20 miles.*

b. Between an arc about a NAVAID and other airspace to be protected:

283.b. Note.—The other airspace to be protected may be an MOA, a holding pattern, airway or route, ATCAA, warning area, restricted area, prohibited area, etc.

(1) At 35 miles or less from the NAVAID—*5 miles.*



283.b.(1). Illustration.

(2) More than 35 miles from the NAVAID—*10 miles.*

Phraseology:

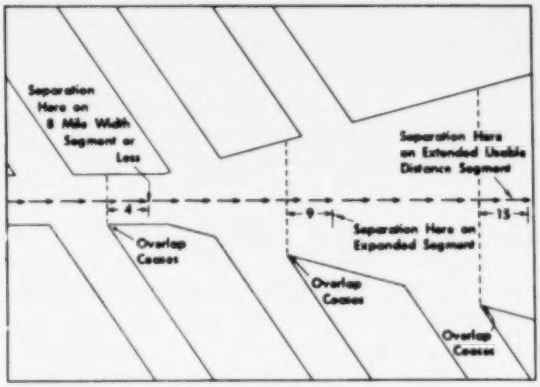
VIA (number of miles) MILE ARC (direction) OF (name of DME NAVAID).

284. RNAV MINIMA—DIVERGING/CROSSING COURSES

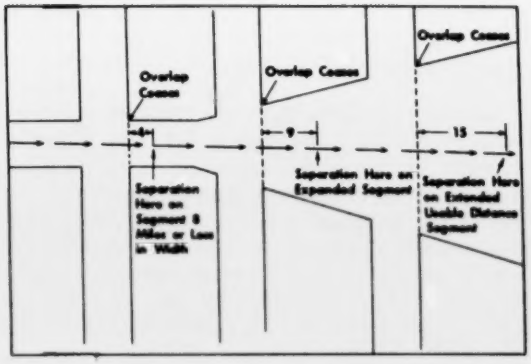
Consider lateral separation to exist when an RNAV aircraft is beyond the point where the lateral protected airspace of that aircraft has ceased to overlap the lateral protected airspace of another by at least:

a. When operating along a route that is 8 miles or less in width—*4 miles.*

b. When operating along an expanded route—*9 miles*, except that *15 miles* shall be applied along that portion of any route segment requiring extended usable distance limitation beyond 130 miles of the reference facility.



284. Illustration 1.



284. Illustration 2.

285-289. RESERVED

Section 8. ROUTE ASSIGNMENT

→ 290. ROUTE USE

Clear aircraft via airways, route structures, and NAVAIDs established for the altitude stratum in which the operation is to be conducted by one or more of the following:

290. **Note.**—Except for certain NAVAIDs/routes used by scheduled air carriers or authorized for specific uses in the control of IFR aircraft, airways, routes, and NAVAIDs established for use at specified altitudes are shown on U.S. Government charts or DOD FLIP charts.

290. **Reference.**—Minimum Enroute Altitudes, 236; Application of Vector, 680.

a. Designated airways and routes.

Phraseology:
VIA:
VICTOR (color) (airway number) (the word ROMEO when RNAV)
or
J (route number) (the word ROMEO when RNAV)
or
SUBSTITUTE (airway or jet route) FROM (fix) TO (fix)
or
IR (route number).
CROSS/JOIN VICTOR/(color) (airway number), (number of miles) MILES (direction) OF (fix).

b. Radials, courses, or direct to or from NAVAIDs.

Phraseology:
DIRECT.
VIA:
(name of NAVAID) (specified) RADIAL/COURSE
or
(fix) AND (fix)
or
RADIALS OF (airway or route) AND (airway or route).

c. DME arcs of VORTAC or TACAN aids.

d. Radials, courses, and headings of departure or arrival routes.

e. SIDs/STARs.

f. Vectors.

g. Fixes defined in terms of degree-distance from NAVAIDs for special military operations.

h. Courses, bearings, quadrants, or radials within a radius of a NAVAID.

Phraseology:
CLEARED TO FLY (general direction from NAVAID) OF (NAVAID name and type) BETWEEN (specified) COURSES TO/BEARINGS FROM/RADIALS (NAVAID name when a NDB) WITHIN (number of miles) MILE RADIUS
or
CLEARED TO FLY (specified) QUADRANT OF (NAVAID name and type) WITHIN (number of miles) MILE RADIUS.

290.h. Examples.—

"Cleared to fly east of Allentown VORTAC between the zero four five and the one three five radials within four zero mile radius." "Cleared to fly east of Crystal Lake radio beacon between the two two five and the three one five courses to Crystal Lake within three zero mile radius." "Cleared to fly northeast quadrant of Philipsburg VORTAC within four zero mile radius."

i. Fixes defined in terms of degree-distance from NAVAIDs or offset from published or established routes/airways at a specified distance and direction for random (impromptu) RNAV Routes. Provide radar monitoring at FL 450 and below.

Phraseology:
DIRECT TO THE (facility) (radial) (distance) FIX.
OFFSET (distance) RIGHT/LEFT OF (route).

290.i. Examples.—

"Direct to the Appleton three one zero radial two five mile fix." "Offset eight miles right of Victor Six."

290.i. Reference.—Radar Separation, 720.

→ 291. UNCONTROLLED AIRSPACE

Include routes through uncontrolled airspace only when requested by the pilot.

291. **Note 1.**—Flight plans filed for random RNAV routes through uncontrolled airspace are considered a request by the pilot.

291. **Note 2.**—Flight plans containing MTR segments in/through uncontrolled airspace are considered a request by the pilot/s.

292. ALTERNATIVE ROUTES

When any part of an airway or route is unusable because of NAVAID status, clear aircraft via one of the following alternative routes:

a. A route depicted on current U.S. Government charts/publications. Use the word "substitute" immediately preceding the alternative route in issuing the clearance.

b. A route defined by specifying NAVAID radials or courses.

c. A route defined as direct to or between NAVAIDs.

293. ROUTE STRUCTURE TRANSITIONS

To effect transition within or between route structure, clear an aircraft by one or more of the following methods, based on VOR, VORTAC, or TACAN NAVAIDs (unless use of other NAVAIDs is essential to aircraft operation or ATC efficiency):

a. Vector aircraft to or from radials or courses of the airway or route assigned.

b. Assign a SID/STAR.

c. Clear departing or arriving aircraft to climb or descend via radials or courses of the airway or jet route assigned.

d. Clear departing or arriving aircraft directly to or between the NAVAIDs forming the airway or route assigned.

e. Clear aircraft to climb or descend via the airway or route on which flight will be conducted.

f. Clear aircraft to climb or descend on specified radials or courses of NAVAIDs.

g. Provide radar monitor when transition to or from a designated or established RNAV route is made along random RNAV routes.

h. Clear RNAV aircraft transitioning to or between designated or established RNAV routes direct to a named waypoint on the new route.

294. RESTRICTED AIRSPACE

If you are controlling an aircraft (including one maintaining VFR conditions-on-top in accordance with an IFR clearance) in an area adjacent to restricted airspace, take the following action before it enters the restricted airspace:

a. For joint-use restricted airspace:

(1) Coordinate, as necessary, with the facility designated as controlling facility or the using agency and obtain permission for the aircraft to operate in the airspace.

294.a.(1) Note.—The FAA is the controlling agency for joint-use restricted airspace, therefore, flight therein is authorized if permission is obtained from the using agency.

(2) Clear the aircraft so it avoids the airspace if permission cannot be obtained.

b. For prohibited or nonjoint-use restricted airspace, clear the aircraft so it avoids the restricted airspace, unless one of the following conditions exists:

294.b. Note.—The FAA has no jurisdictional authority over the use of prohibited or non-joint use restricted airspace; therefore, clearance cannot be issued for flight therein.

(1) The aircraft informs you it has obtained permission from the using agency to operate in the airspace.

(2) The using agency informs you they have given permission for the aircraft to operate in the airspace.

294.b.(2) Note.—Using agency approval for flight in prohibited or non-joint use restricted airspace may be relayed to the pilot.

(3) The aircraft is on an approved ALTRV.

294.b.(3) Note.—Mission project officers are responsible for obtaining approval for ALTRV operations within restricted airspace.

295. RESTRICTED AIRSPACE AVOIDANCE

Take the following action to clear an aircraft so it avoids restricted airspace:

a. For an aircraft maintaining a specified altitude, clear it at an altitude or via a route which will avoid the airspace.

b. For an aircraft maintaining VFR conditions-on-top, clear it to conduct flight in VFR conditions-on-top above the upper limit or below the lower limit of the airspace.

Phraseology:
MAINTAIN V-F-R CONDITIONS ON TOP ABOVE (upper limit of restricted airspace) OR BELOW (lower limit of restricted airspace) BETWEEN (fix) AND (fix).

c. For an aircraft on a radius-of-action flight, clear it via courses, bearings, quadrants, or radials within a radius of a NAVAID, excluding specified restricted areas.

Phraseology:

CLEARED TO FLY (general direction from NAVAID) OF (NAVAID name and type) BETWEEN (specified) COURSES TO/BEARINGS FROM/RADIALS (NAVAID name when a NDB) WITHIN (number of miles) MILE RADIUS

or

CLEARED TO FLY (specified) QUADRANT OF (NAVAID name and type) WITHIN (number of miles) MILE RADIUS EXCLUDING (name or number of restricted airspace)

or

EXCLUDING ALL RESTRICTED AIRSPACE.

296. MILITARY OPERATIONS AREAS

Clear IFR aircraft in/through an MOA provided approved separation will be applied between MOA operations and nonparticipating aircraft as covered in a Letter of Agreement between the ATC facility and the military base associated with the MOA. If conditions/workload do not permit, take the appropriate action in **a.** or **b.**, below.

296. **Note 1.**—Although aircraft can be cleared through MOAs when conditions permit, aviation user groups have been alerted to potential derogating effects of routine flight plan filing through MOAs. They have been requested to continue the present method of filing IFR flight plans so as to avoid MOA airspace.

296. **Note 2.**—Participating interceptor aircraft are required to operate to and from MOAs in accordance with an ATC clearance under the control of either an FAA or military ATC facility. While conducting interceptor training within MOAs, the aircraft must be under radar surveillance at all times by the appropriate military facility.

a. For an aircraft maintaining a specified altitude—Assign an altitude above the upper limit or below the lower limit of the MOA or issue a routing to avoid it.

b. For an aircraft maintaining VFR conditions-on-top—Clear it to conduct flight in VFR conditions-on-top above the upper limit or below the lower limit of the MOA.

Phraseology:

MAINTAIN V-F-R CONDITIONS ON TOP ABOVE (upper limit of the MOA) OR BELOW (lower limit of the MOA) ACROSS (MOA name) BETWEEN (fix) AND (fix).

c. Aircraft on an approved ALTRV may also be allowed to operate in/through an MOA.

296.c. **Note.**—The mission project officer is responsible for coordinating with the appropriate Air Training Command air base unit and obtaining approval for ALTRV operations within an MOA.

→297. DEGREE-DISTANCE ROUTE DEFINITION USAF/USN

EN ROUTE

Do not accept a flight plan whose route or route segments do not coincide with designated airways or jet routes or with a direct course between navaids unless the route or route segments are defined as follows:

297. **Note.**—The following military operations are authorized to define portions of their routing in accordance with degree-distance route definition:

a. Airborne radar navigation, radar bomb scoring (RBS), and airborne missile programming conducted by USAF, USN and RAF.

b. Celestial navigation conducted by USAF, USN, and RAF.

c. Target aircraft operating in conjunction with ADC interceptors, and ADC interceptors while en route to and from assigned airspace.

d. Missions conducted above FL 450.

e. USN fighter and attack aircraft operating in positive control airspace.

f. USN/USMC aircraft, TACAN equipped, operating within the Honolulu FIR/Hawaiian airways area.

g. USAF/USN/USMC aircraft flight planned to operate on MTRs.

a. The portion of the route which cannot be defined by a designated airway or jet route or a course between NAVAIDs is defined in the flight plan as a point composed of the following:

(1) A location identifier.

(2) Azimuth in degrees magnetic.

(3) Distance in miles from the NAVAID.

297.a. **Example.**—

"MKE 030025."

b. The NAVAIDs selected are VOR/VOR-DME/VORTAC/TACAN NAVAIDs authorized for use at the altitude being flown and the distance from the NAVAID does not exceed the distance criteria for the NAVAID being used.

297.b. **Note.**—Military aircraft using degree-distance procedures conduct operations in accordance with the following:

a. The departure and arrival phases are flight-planned to conform with the routine flow of traffic when operating within 75 miles of the departure and destination airport unless prior coordination has been effected with the appropriate air traffic control facility. Routings are defined via appropriate routes or airways, a direct course between NAVAIDs, or as otherwise required to conform to the normal flow of traffic.

b. Flight plans are filed at least 2 hours before the estimated time of departure when any portion of the requested routing is defined in accordance with degree-distance procedures.

c. Airborne radar navigation and RBS aircraft conduct navigation to, from, or between special route definition fixes by the use of airborne radar, and in most cases airborne radar is used to provide navigation when the route is defined as direct over NAVAIDs or over established route systems.

d. When ADC target force aircraft file flight plans to operate in the high altitude structure, they define degree-distance fixes based on high altitude en route NAVAIDs depicted on high altitude charts, regardless of the type of NAVAID used to navigate to these fixes.

e. ADC target force aircraft maintain communications watch on 243.0 MHz and the appropriate ADC or ATC frequency while operating within an intercept area.

c. The distance between the fixes used to define the route does not exceed:

(1) Below FL 180—*80 miles,* except that for celestial navigation flights the distance in (2) shall apply between fixes used to define the celestial navigation portion of the route of flight.

(2) FL 180 and above—*260 miles.*

d. Consider special route definition fixes as compulsory reporting points, except that an aircraft may be authorized to omit reports over these fixes when traffic conditions permit.

298. JOINT-USE WARNING AREAS

a. Clear IFR aircraft in/through a joint-use warning area provided the warning area has been designated as controlled airspace and the warning area has been released by the using agency as covered in a Letter of Procedure between the controlling and using agencies.

298.a. **Note.**—The FAA is the controlling agency for joint-use warning areas.

b. Clear the aircraft so it avoids the warning area if the airspace has not been released by the using agency, unless one of the following conditions exist:

(1) The aircraft informs you it has the using agency's permission to operate in the airspace.

(2) The using agency informs you they have given permission for the aircraft to operate in the airspace.

298.b.(2) **Note.**—Using agency permission for aircraft to operate in warning areas may be relayed to the pilot.

299. ATC ASSIGNED AIRSPACE

a. Provide approved separation between participating and nonparticipating IFR aircraft cleared in/through ATC assigned airspace as covered in a Letter of Agreement between the local military authorities and the ATC facilities concerned. If this is not possible, take the following appropriate action:

(1) For a nonparticipating aircraft maintaining a specified altitude, clear it at an altitude or via a route which will avoid the airspace.

(2) For a nonparticipating aircraft maintaining VFR conditions-on-top, clear it to conduct flight in VFR conditions-on-top above the upper limit or below the lower limit of the airspace.

299.a. **Note.**—Participating interceptor aircraft are required to operate to and from ATC assigned airspace in accordance with an ATC clearance under the control of either an FAA or Military ATC facility. While conducting training within ATC assigned airspace, the aircraft must be under radar surveillance at all times by the appropriate military facility.

299.a. **Reference.**—Handbook 7610.4, Part 5.

b. Do not authorize nor request military radar units to provide air traffic control service to other than participating military aircraft operating within ATC assigned airspace which has been released to the unit by the appropriate ATC facility.

299.b. **Note.**—MARSA applies between all participating aircraft operating within ATC assigned airspace.

c. Transfer control jurisdiction or radio communication, radar hand-offs, and exchange of control information as specified by Letter of Agreement.

d. When providing radar advisory service to a VFR aircraft, alert the pilot of military training activity in progress and take the following action if the pilot indicates intentions to penetrate the ATC assigned airspace:

(1) To the extent possible, radar identify the aircraft to the military controller, and

(2) Continue to provide radar advisory service to the VFR aircraft through the ATC assigned airspace if workload conditions permit.

→300. IFR MILITARY TRAINING ROUTES

a. Clear an IFR aircraft though an IFR MTR provided separation will be applied between MTR route operations and nonparticipating aircraft. If this is not practical, take action in accordance with **299.a.** (1) and (2).

b. When providing radar advisory service to a VFR aircraft that will penetrate an IR, alert the pilot of the military training activity in progress.

301-319. RESERVED

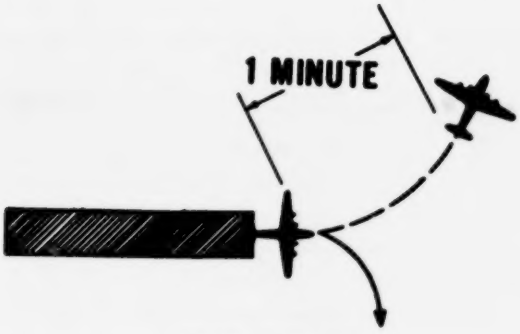
Section 10. INITIAL SEPARATION OF SUCCESSIVE DEPARTING AIRCRAFT

340. MINIMA ON DIVERGING COURSES

Separate aircraft that will fly courses diverging by 45 degrees or more after departing the same or adjacent airports by use of one of the following minima:

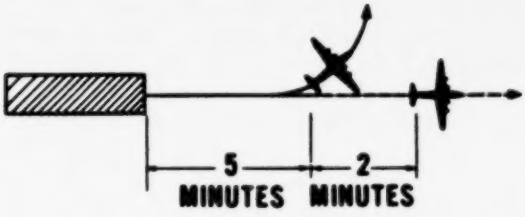
a. When aircraft will fly diverging courses:

(1) Immediately after takeoff—*1 minute* until courses diverge.



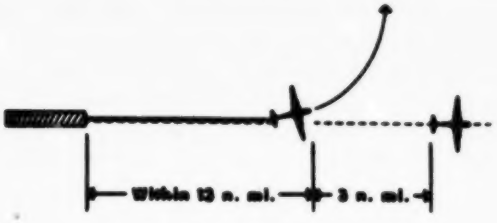
340.a.(1) Illustration

(2) Within 5 minutes after takeoff—*2 minutes* until courses diverge.



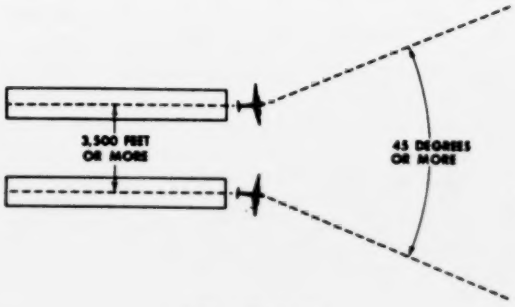
340.a.(2) Illustration

(3) Within 13 miles DME after takeoff—*3 miles* until courses diverge.



340.a.(3) Illustration

b. *TERMINAL:* Between aircraft departing in the same direction from different runways whose centerlines are parallel and separated by at least 3,500 feet—Authorize simultaneous take-offs when the aircraft will fly diverging courses immediately after takeoff.



340.b. Illustration

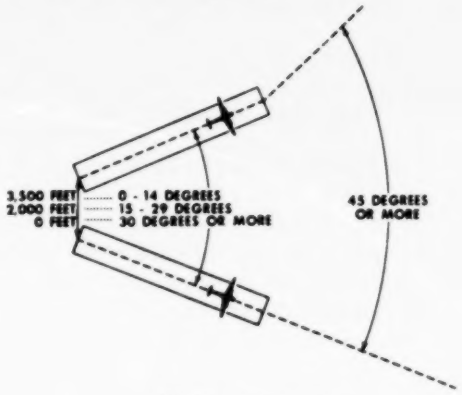
c. *TERMINAL:* Between aircraft that will fly diverging courses immediately after takeoff from diverging runways:

(1) Non-intersecting runways—Authorize simultaneous take-offs when either of the following conditions exist:

(a) The runways diverge by 30 degrees or more.

(b) The distance between runway centerlines at and beyond the points where takeoffs begin is at least:

(i) 2,000 feet and the runways diverge by 15 to 29 degrees inclusive.

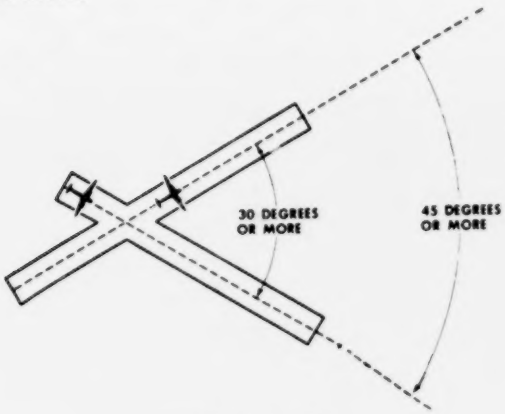


340.c.(1). Illustration

(ii) 3,500 feet and the runways diverge by less than 15 degrees.

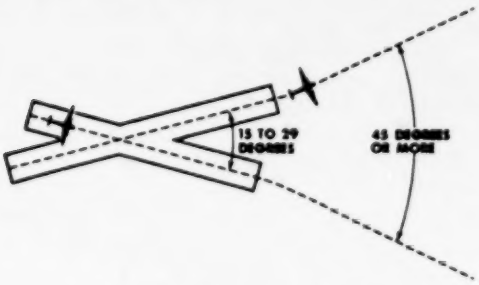
(2) Intersecting runways — Authorize take-off of a succeeding aircraft when the preceding aircraft has passed the point of runway intersection, and

(a) The runways diverge by 30 degrees or more.



340.c.(2)(a) Illustration

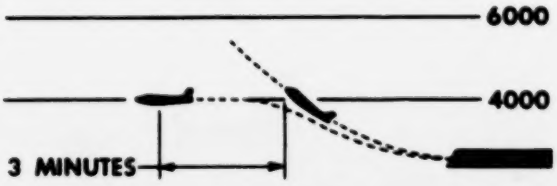
(b) The runways diverge by 15 to 29 degrees inclusive and the preceding aircraft has commenced a turn.



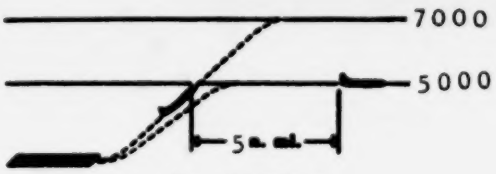
340.c.(2)(b) Illustration

341. MINIMA ON SAME COURSE

Separate aircraft that will fly the same course when the following aircraft will climb through the altitude assigned to the leading aircraft by using a minimum of *3 minutes* until the following aircraft passes through the assigned altitude of the leading aircraft; or *5 miles* if both aircraft are using DME.



341. Illustration 1



341. Illustration 2

342-344. RESERVED

Section 18. VISUAL SEPARATION AND VFR

490. VISUAL SEPARATION

Aircraft may be separated by visual means, as provided in this paragraph, when other approved separation is assured before and after the application of visual separation. To ensure that other separation will exist consider aircraft performance, routes of flight, and weather conditions. Weather conditions must allow the aircraft to remain within sight until other separation exists. Do not apply visual separation between successive departures when departure routes and/or aircraft performance preclude maintaining separation.

490. References.—Visual Approaches, 430, 796. Glossary (Visual Approach, Visual Separation).

a. *TERMINAL:* You may apply visual separation between aircraft under your facility's control within the terminal area, provided:

(1) You are in communication with at least one of the aircraft involved, and

(2) You see the aircraft and maintain visual separation between them, or

(3) A pilot sees another aircraft and you instruct him to maintain visual separation from it. If the aircraft are on converging courses, inform the other aircraft of the traffic and that visual separation is being applied.

Phraseology:

TRAFFIC, (number) O'CLOCK, (number of miles) MILES, (direction) BOUND, (type of aircraft), HAS YOU IN SIGHT, AND WILL MAINTAIN VISUAL SEPARATION.

b. *EN ROUTE:* You may use visual separation in conjunction with visual approach procedures.

490.b. Reference—Visual Approaches, 430, 796.

c. You may authorize a nonapproach control tower to provide visual separation between two aircraft within a control zone provided other separation is assured before and after the application of visual separation. Visual separation may be authorized between:

(1) An arriving and a departing aircraft when the tower has the arrival in sight.

(2) A departure and a departure when weather is at or above VFR minima.

(3) An arrival and an arrival provided the tower has both aircraft in sight and visual separation can be applied.

Phraseology:

VISUAL SEPARATION APPROVED BETWEEN (identification) AND (identification)

and for departing aircraft

(departing/succeeding aircraft) RELEASED YOUR DISCRETION.

490.c. Note.—Separation of IFR aircraft before and after application of visual separation is an IFR control function (approach/departure/en route). A nonapproach control tower controller by accepting authorization for visual separation becomes responsible for ensuring that separation. Separation requirements also apply to VFR aircraft when IFR, TCA, or Stage III separation is prescribed. (See 180, 435, 680, 796, and 1280–1287.)

491. VFR CONDITIONS

a. You may clear aircraft to maintain VFR conditions if one of the following conditions exists:

(1) The pilot has requested the clearance.

(2) *TERMINAL:* The clearance will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA-approved noise abatement route or altitude.

(3) *TERMINAL:* The pilot has requested a practice instrument approach and is not on an IFR flight plan.

Phraseology:

MAINTAIN V-F-R UNTIL (time or fix). CLIMB/
DESCEND V-F-R:
BETWEEN (altitude) AND (altitude)

or

ABOVE/BELOW (altitude).

491.a.(3) Reference.—Practice Approaches, 435.

b. Issue an alternative clearance when there is reason to believe that flight in VFR conditions may become impracticable.

Phraseology:

IF NOT POSSIBLE (alternative procedure) AND ADVISE.

492. VFR ON TOP

a. You may clear an aircraft to maintain VFR conditions-on-top of a cloud, haze, smoke, or other meteorological formation if the following conditions are met:

(1) The pilot requests the clearance.

492.a.(1) Note—Requests which include a filed flight plan altitude of OTP indicate that the flight intends to operate only at altitudes in airspace where OTP is permitted.

492.a.(1) Reference.—Positive Control Area Restrictions, 182.

(2) You inform the pilot of the reported height of the tops of the meteorological formation.

Phraseology:

MAINTAIN V-F-R ON TOP. TOPS REPORTED (altitude).

(3) You inform the pilot accordingly if no top report is available.

Phraseology:

MAINTAIN V-F-R ON TOP. NO TOPS REPORTED.

b. When tops are not reported, take the following action:

(1) Issue an alternative clearance.

Phraseology:

IF NOT ON TOP AT (altitude), MAINTAIN (altitude) AND ADVISE. REPORT REACHING V-F-R ON TOP.

(2) When the pilot reports reaching VFR conditions-on-top, cancel the alternative clearance by reclearing the aircraft to maintain VFR conditions-on-top.

Phraseology:

MAINTAIN V-F-R ON TOP.

c. Do not clear an aircraft to maintain VFR conditions on top when a pilot report indicates weather conditions are not suitable or between sunset and sunrise to separate holding aircraft from each other.

493. ALTITUDE FOR DIRECTION OF FLIGHT

Inform an aircraft of the correct altitude for direction of flight when a report from an aircraft maintaining VFR conditions-on-top indicates it is not complying with FAR 91.

493. Note.—As required by FAR 91, the appropriate VFR altitudes for direction of flight are as follows:

Flights on Magnetic Courses 0°–179°

3,000 feet above the surface to but not including FL 290: "odd" cardinal altitudes plus 500 feet. Examples: 3,500, 5,500, FL 255, FL 275.

FL 290 and above: 4,000 foot intervals beginning with FL 300. Examples: FL 300, FL 340.

Flights on Magnetic Courses 180°–359°

3,000 feet above the surface up to but not including FL 290: "even" cardinal altitudes plus 500 feet. Examples: 4,500, 6,500, FL 265, FL 285.

FL 290 and above: 4,000 foot intervals beginning with FL 320. Examples: FL 320, FL 360.

Phraseology:

V-F-R ON TOP CRUISING LEVELS FOR YOUR DIRECTION OF FLIGHT ARE:

From 3,000 feet above the surface to but not including FL 290

ODD/EVEN ALTITUDES/FLIGHT LEVELS PLUS FIVE HUNDRED FEET.

At or above FL 290

FOUR THOUSAND FOOT INTERVALS BEGINNING AT FLIGHT LEVEL THREE ZERO ZERO/THREE TWO ZERO.

494–599. RESERVED

Section 5. TRANSFER OF RADAR IDENTIFICATION

700. APPLICATION

To provide continuous radar service to an aircraft and facilitate a safe, orderly, expeditious flow of traffic, it is often necessary to transfer radar identification of an aircraft from one controller to another. This section describes the terms, methods, and responsibilities associated with this task. Inter and intrafacility transfers of radar identification shall be accomplished in all areas of radar surveillance except where it is not operationally feasible. Where such constraints exist, they shall be:

a. Covered in Letters of Agreement which clearly state that control will not be based upon a radar handoff, or

b. Coordinated by the transferring and receiving controllers for a specified period of time.

701. TERMS

a. *Handoff*—An action taken to transfer the radar indentification of an aircraft from one controller to another controller if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will be transferred.

b. *Radar Contact*—The term used to inform the controller initiating a handoff that the aircraft is identified and approval is granted for the aircraft to enter the receiving controller's airspace.

c. *Point Out*—An action taken by a controller to transfer the radar indentification of an aircraft to another controller if the aircraft will or may enter the airspace or protected airspace of another controller and radio communications will not be transferred.

d. *Point Out Approved*—The term used to inform the controller initiating a point out that the aircraft is identified and that approval is granted for the aircraft to enter the receiving controller's airspace, as coordinated, without a communications transfer.

e. *Traffic*—A term used to transfer radar identification of an aircraft to another controller for the purpose of coordinating separation action. Traffic is normally issued (a) in response to a handoff or point out, (b) in anticipation of a handoff or point out, or (c) in conjunction with a request for control of an aircraft.

f. *Traffic Observed*—The term used to inform the controller issuing the traffic restrictions that the traffic is identified and that the restrictions issued are understood and will be complied with.

→ 702. METHODS

a. Transfer the radar identification of an aircraft by at least one of the following methods:

(1) Physically point to the target on the receiving controller's display.

(2) Use landline voice communications.

(3) Use automation capabilities.

(4) *TERMINAL:* Use the "Modify" or "Quick Look" functions for data transfer between the TRACON and tower cab only if specific procedures are established in a Facility Directive. The local controller has the responsibility to determine whether or not conditions are adequate for the use of ARTS data on the BRITE.

702.a.(4) Reference.—7210.3—1323, Use of ARTS Modify and Quick Look Functions

b. When using the above methods, comply with the Standard Operating Practice contained in **Appendix 5.**

c. When making a handoff, point out, or issuing traffic restrictions, relay information to the receiving controller in the following order:

(1) The position of the target relative to a fix, map symbol, or radar target known and displayed by both the receiving and transferring controller.

(2) The aircraft identification.

(3) The assigned altitude, appropriate restrictions, and information that the aircraft is climbing or descending, if applicable, except when inter/intrafacility directives ensure that the altitude information will be known by the receiving controller.

d. If any doubt as to target identification exists after attempting confirmation in accordance with this section, apply the provisions of paragraph **661.**, Questionable Identification.

703. RESPONSIBILITIES

a. Handoff—

(1) The transferring controller shall:

(a) Complete a radar handoff prior to an aircraft entering the airspace delegated to the receiving controller.

(b) Verbally obtain the receiving controller's approval prior to making any changes to an aircraft's flight path, altitude, or data block information while the handoff is being initiated or after acceptance.

(c) Ensure that potential conflicts are resolved prior to transferring communications and that restrictions issued to the aircraft to ensure separation are passed to the receiving controller.

(d) Comply with restrictions issued by the receiving controller unless otherwise coordinated.

(e) Transfer communications before an aircraft enters the receiving controller's area unless otherwise coordinated. To the extent possible, transfer communications when the handoff has been accepted.

703.a. (1)(e) Note.—Before ARTS Modify/Quick Look function is used to transfer radar identification, a Facility Directive which specifies communication transfer points is required.

(f) Advise the receiving controller of pertinent information not contained in the data block or flight progress strip unless covered in a Letter of Agreement or Facility Directive. Pertinent information includes:

(i) Assigned heading.

(ii) Air speed restrictions.

(iii) Altitude information issued.

(iv) Observed track or deviation from the last route clearance.

(v) The beacon code if different than that normally used or previously coordinated.

(vi) Any other pertinent information.

(g) Ensure that the data block is associated with the appropriate target.

(h) Initiate verbal coordination to verify position of primary or nondiscrete targets when using the automated handoff function except for single sensor system intrafacility handoffs.

(i) Initiate verbal coordination before transferring control of a track when CST, FAIL, NONE, NB, or IF is displayed in the data block.

(j) Advise the receiving controller that radar monitoring is required when the aircraft is on a direct route initiated by ATC that exceeds useable navaid distances.

(k) Issue restrictions to the receiving controller which are necessary to maintain separation from other aircraft within your area of jurisdiction before releasing control of the aircraft.

(l) Consider the target being transferred as identified on the receiving controller's display when the receiving controller acknowledges receipt verbally or has accepted an automated handoff.

(2) The receiving controller shall:

(a) Ensure that the target position corresponds with the position given by the transferring controller or that there is an appropriate association between an automated data block and the target being transferred before accepting a handoff.

(b) Issue restrictions that are needed for the aircraft to enter your sector safely before accepting the handoff.

(c) Comply with restrictions issued by the initiating controller unless otherwise coordinated.

(d) Until the aircraft is in your area of jurisidiction, obtain the transferring controller's approval before changing the heading, altitude, speed, or beacon code of an aircraft unless such changes are covered by a Letter of Agreement or Facility Directive.

(e) After accepting a handoff from another controller, confirm the identity of primary target by advising the aircraft of its position, and of a beacon target by observing a code change, an "Ident" reply, or a "standby" squawk unless one of these was used during handoff. These provisions do not apply at those towers and GCAs which have been delegated

the responsibility for providing radar separation within designated areas by the parent approach control facility and the aircraft identification is assured by sequencing or positioning prior to the handoff.

703.a. (2)(e) Reference.—Approach Separation Responsibility, 795.

(f) When using automation to transfer radar identification, consider a discrete beacon target's identity to be confirmed when:

(i) The data block associated with the target being handed off indicates the computer assigned discrete beacon code is being received, or

(ii) You observe the deletion of a discrete code that was displayed in the data block, or

703.a. (2)(f)(ii) Note.—When the aircraft generated discrete beacon code does not match the computer assigned beacon code, the code generated will be displayed in the data block. When the aircraft changes to the assigned discrete code, the code disappears from the data block. In this instance, the observance of code removal from the data block satisifies confirmation requirements.

(iii) You observe the numeric display of a discrete code that an aircraft has been instructed to squawk or reports squawking.

(g) Initiate verbal coordination prior to accepting control of a track when CST, NAT, AMB, NONE, OLD, NB, or TU is displayed in the data block.

(i) When an automated interfacility handoff action is initiated and "AMB" is displayed in the full data block, advise the other facility that a disparity exists between the position declared by their computer and that declared by your ARTS.

(ii) When an automated interfacility handoff action is initiated and "NAT" or "TU" is displayed in the full data block, advise the other facility if a disparity exists between the position declared by their computer and the actual target position.

b. Point Out—

(1) The transferring controller shall:

(a) Obtain verbal approval before permitting an aircraft to enter the receiving controller's delegated airspace.

(b) Obtain the receiving controller's approval before making any changes to an aircraft's flight path, altitude, or data block information after the point out has been approved.

(c) Comply with restrictions issued by the receiving controller unless otherwise coordinated.

(d) Be responsible for subsequent radar handoffs and communications transfer, including flight data revisions and coordination, unless otherwise agreed to by the receiving controller or as specified in a Letter of Agreement.

(2) The receiving controller shall:

(a) Ensure that the target position corresponds with the position given by the transferring controller or that there is an association between a computer data block and the target being transferred prior to approving a point out.

(b) Be responsible for separation between point out aircraft and other aircraft within his/her area of jurisdiction.

(c) Issue restrictions necessary to provide separation from other aircraft within his/her area of jurisdiction.

c. Traffic—

(1) When using the term "traffic" for coordinating separation, the controller issuing traffic shall issue appropriate restrictions.

(2) The controller accepting the restrictions shall be responsible to ensure that approved separation is maintained between the involved aircraft.

704-719. RESERVED

Section 6. RADAR SEPARATION

720. APPLICATION

a. Radar separation shall be applied to all RNAV aircraft operating on a random (impromptu) route at or below FL 450.

b. Radar separation may be applied between:

(1) Radar identified aircraft.

(2) An aircraft taking off and another radar-identified aircraft when the aircraft taking off will be radar-identified within 1 mile of the runway end.

(3) A radar-identified aircraft and one not radar-identified when either is cleared to climb/descend through the altitude of the other provided:

(a) The performance of the radar system is adequate and, as a minimum, primary radar targets are being displayed on the display being used within the airspace within which radar separation is being applied, and

(b) Flight data on the aircraft not radar-identified indicate it is a type which can be expected to give adequate primary return in the area where separation is applied, and

(c) The airspace within which radar separation is applied is not less than the following number of miles from the edge of the radar display:

(i) When less than 40 miles from the antenna—*6 miles;*

(ii) When 40 miles or more from the antenna—*10 miles;*

(iii) Narrowband radar operations—*10 miles,* and

(d) Radar separation is maintained between the radar-identified aircraft and all observed primary and secondary radar targets until nonradar separation is established from the aircraft not radar identified, and

(e) When the aircraft involved are on the same relative heading, the radar-identified aircraft is vectored a sufficient distance from the route of the aircraft not radar identified to assure the targets are not superimposed prior to issuing the clearance to climb/descend.

721. TARGET SEPARATION

Apply radar separation:

a. Between the centers of primary radar targets; however, do not allow a primary target to touch another primary target or a beacon control slash.

b. Between the ends of beacon control slashes.

721.b. Note.—At TPX-42 sites, the bracket video feature must be activated to display the beacon control slash.

c. Between the end of a beacon control slash and the center of a primary target.

d. *All-Digital Displays:* Between the centers of digitized targets. Do not allow targets to touch.

722. BEACON RANGE ACCURACY

a. You may use beacon targets for separation purposes if beacon range accuracy is verified by one of the following methods:

722.a. Note 1.—The check for verification of beacon range accuracy accomplished by correlation of beacon and primary radar targets of the same aircraft is not a check of display accuracy. Therefore, it is not necessary that it be done using the same display with which separation is being provided, nor the same targets being separated.

722.a. Note 2.—*Narrowband:* Beacon range accuracy for automated narrowband display equipment is verified by AF personnel. Consequently, further verification by the controller is unnecessary.

(1) Correlate beacon and primary targets of the same aircraft (not necessarily the one being provided separation) to assure that they coincide.

(2) When beacon and primary targets of the same aircraft do not coincide, correlate them to assure that any beacon displacement agrees with the specified distance and direction for that particular radar system.

(3) Refer to beacon range monitoring equipment where so installed.

b. If beacon range accuracy cannot be verified, you may use beacon targets only for traffic information.

→ 723. CONFLICT ALERT

a. When a conflict alert is displayed, take appropriate action to resolve the confliction. Initiate coordination with the controller involved to determine the best resolution if the alert involves an aircraft:

(1) In another controller's airspace.

(2) Under position/track control of another controller.

(3) In handoff status.

Coordination is not necessary if immediate control action is required to maintain separation or both aircraft will be under your control in adequate time to ensure separation.

723.a. **Reference.**—7210.3—1023.

b. A conflict alert may be suppressed or inhibited. Computer entry of a message suppressing or inhibiting conflict alerts constitutes an acknowledgement for the alert and indicates appropriate action has or will be taken. Inhibiting aircraft pairs or specific aircraft at another control position shall be fully coordinated.

c. NAS En Route Stage A. The controller may suppress the display of a conflict alert from a control position with the application of one of the following suppress/inhibit computer functions:

(1) The Conflict Suppress (CO) function may be used to suppress the C.A. display between specific aircraft for a specific alert.

(2) The Group Suppression (GS) function shall be applied exclusively to inhibit the displaying of alerts among military aircraft engaged in special military operations where standard en route separation criteria do not apply.

723.c. **Note.**—Special military operations where the GS function would typically apply involve those activities where military aircraft routinely operate in proximities to each other that are less than standard en route separation criteria (i.e., air refueling operations, ADC practice intercept operations.)

723.c. **Reference.**—7210.3E—1023.b.

724-739. RESERVED

Section 7. RADAR SEPARATION MINIMA

740. APPLICATION

Separate aircraft by the following minima:

740. **Note.**—Chapter 6, Wake Turbulence, specifies increased separation minima required for certain classes of aircraft because of the possible effects of wake turbulence.

a. Broadband Radar System:

(1) When less than 40 miles from the antenna—*3 miles.*

(2) When 40 miles or more from the antenna—*5 miles.*

EN ROUTE:

b. Stage A:

(1) When less than 40 miles from the antenna:

(a) Below FL 180—*3 miles,* except where Facility Directives specify *5 miles* separation.

740.b.(1)(a) **Note.**—Exception: Where a significant operational advantage is obtained by modifying radar site adaptation, Facility Directives are required to define the areas where *5-mile* separation applies.

740.b.(1)(a) **Reference.**—7210.3-1020, Single Site Coverage.

(b) FL 180 to below FL 600—*5 miles.*

(c) At or above FL 600—*10 miles.*

(2) When 40 miles or more from the antenna:

(a) Below FL 600—*5 miles.*

(b) At or above FL 600—*10 miles.*

c. EARTS:

(1) When less than 40 miles from the antenna—*3 miles.*

(2) When 40 miles or more from the antenna—*5 miles.*

741. PASSING OR DIVERGING

Except in NAS En Route Stage A during narrowband operation, vertical separation between aircraft may be discontinued when the following conditions are met:

741. **Note.**—Although vertical separation may be discontinued, the requirements of **1420.a.** and **b.** must be applied when operating behind a heavy jet.

a. You observe that they have passed each other or that one has crossed the projected course of another.

b. Their tracks are monitored to assure that their primary targets or beacon control slashes will not touch.

c. Their courses diverge at least 15 degrees.

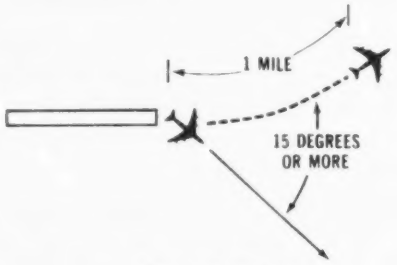
742. SUCCESSIVE OR SIMULTANEOUS DEPARTURES

TERMINAL

Separate aircraft departing from the same airport or adjacent airports in accordance with the following minima provided radar identification with the aircraft will be established within 1 mile of the takeoff runway end and courses will diverge by 15 degrees or more.

742. **Note.**—Handbook 8260.19, Flight Procedures and Airspace, establishes guidelines for IFR departure turning procedures which assumes a climb to 400 feet before a turn is commenced. Order 8290.3B, TERPs, the ILS missed approach criteria require a straight climb of 400 feet be specified where turns greater than 15 degrees are required.

a. Between aircraft departing the same runway—*1 mile* if courses diverge immediately after departure.

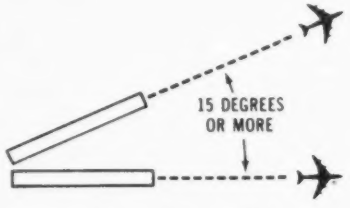


742.a. Illustration

742.a. **Note.**—This procedure does not apply when Category I or II aircraft are taking off from an intersection on the same runway behind a preceding departing Category III aircraft or when aircraft are departing behind a heavy jet.

b. Between aircraft departing from diverging runways:

(1) Nonintersecting runways—Authorize simultaneous takeoffs if runways diverge by 15 degrees or more.



742.b.(1) Illustration

Section 9. RADAR ARRIVALS

790. VECTORS TO FINAL APPROACH COURSE

Except as provided in **796**, vector arriving aircraft to intercept the final approach course:

a. At least 2 miles outside the approach gate unless one of the following exists:

(1) When the reported ceiling is at least 500 feet above the MVA and the visibility is at least 3 miles (report may be a PIREP if no weather is reported for the airport), aircraft may be vectored to intercept the final approach course closer than 2 miles outside the approach gate, but no closer than the approach gate.

(2) If specifically requested by the pilot, aircraft may be vectored to intercept the final approach course inside the approach gate, but no closer than the final approach fix.

b. For a precision approach, at an altitude not above the glide slope.

c. For a nonprecision approach, at an altitude which will allow descent in accordance with the published procedure.

790.c. Note.—A pilot request for an "evaluation approach," or a "coupled approach," or use of a similar term, indicates he desires the application of **790.a. and b.**

791. FINAL APPROACH COURSE INTERCEPTION

Assign headings that will permit final approach course interception on a track that does not exceed the interception angles specified in the **Table.**

791. Note.—The intent is to provide for a track-course intercept angle judged by the controller to be no greater than specified by this procedure.

791. Reference.—Approaches, Chapter 3, Sections 14 and 15.

791. Table.—Approach Course Interception Angle.

Distance from interception point to approach gate	*Maximum interception angle*
Less than 2 miles	20 degrees
2 miles or more	30 degrees (45° for helicopters)

792. RESERVED

793. VECTORS ACROSS FINAL APPROACH COURSE

Inform the aircraft whenever a vector will take it across the final approach course and state the reason for such action.

793. Note.—In the event you are unable to so inform the aircraft, the pilot is not expected to turn inbound on the final approach course unless approach clearance has been issued.

Phraseology:

EXPECT VECTOR ACROSS FINAL APPROACH COURSE FOR (purpose).

793. Example.—

"Expect vector across final approach course for spacing."

794. ARRIVAL INSTRUCTIONS

Issue all of the following to an aircraft before it reaches the approach gate:

a. Position relative to a fix on the final approach course. If none is portrayed on the radar display or if none is prescribed in the procedure, issue position information relative to the navigation aid which provides final approach guidance or relative to the airport.

b. Vector to intercept the final approach course, if required.

c. Approach clearance except when conducting a radar approach. Issue approach clearance only after the aircraft is:

(1) Established on a segment of a published route or instrument approach procedure, or

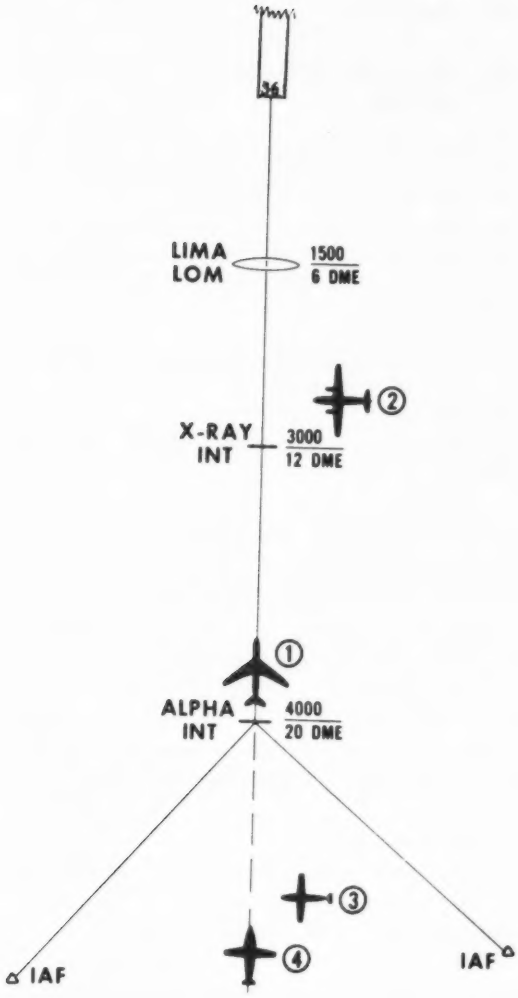
794.c.(1) Example.—

Aircraft 1 was vectored to the final approach course, but clearance was withheld. It is now at 4,000 feet and established on a segment of the instrument approach procedure. "Seven miles from X-ray. Cleared for I-L-S runway three six approach."

(2) Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.

794.c.(2) Example 1.—

Aircraft 2 is being vectored to a published segment of the final approach course, 4 miles from Lima at



794.c. Illustration

2,000 feet. The MVA for this area is 2,000 feet. "Four miles from Lima. Turn right heading three four zero. Maintain two thousand until established on the localizer. Cleared for I-L-S Runway Three Six Approach."

794.c.(2) Example 2.—

Aircraft 3 is being vectored to intercept the final approach course beyond the approach segments, 5 miles from Alpha at 5,000 feet. The MVA for this area is 4,000 feet. "Five miles from Alpha. Turn right heading three three zero. Cross Alpha at or above four thousand. Cleared for I-L-S Runway Three Six Approach."

794.c.(2) Example 3.—

Aircraft 4 is established on the final approach course beyond the approach segments, 8 miles from alpha at 6,000 feet. The MVA for this area is 4,000 feet. "Eight miles from Alpha. Cross Alpha at or above four thousand. Cleared for I-L-S Runway Three Six Approach."

794.c.(2) Note 1.—The altitude assigned must assure IFR obstruction clearance from the point at which the approach clearance is issued until established on a segment of a published route or instrument approach procedure.

794.c.(2) Note 2.—If the altitude assignment is VFR-on-top, it is conceivable that the pilot may elect to remain high until arrival over the final approach fix which may require the pilot to circle to descend so as to cross the final approach fix at an altitude that would permit landing.

d. Instructions to do one of the following:

794.d. Note.—The principal purpose of this paragraph is to ensure that frequency changes are made prior to passing the final approach fix. However, at times it will be desirable to retain an aircraft on the approach control frequency to provide a single-frequency approach or other radar services. When this occurs, it will be necessary to relay tower clearances or instructions to preclude changing frequencies prior to landing or approach termination.

(1) Monitor local control frequency, reporting to the tower when over the approach fix.

(2) Contact the tower on local control frequency.

794.d.(2) Reference.—Communications Release, 390.

(3) Contact the final controller on the appropriate frequency if radar service will be provided on final on a different frequency.

794.d.(3) Reference.—Final Controller Changeover, 1162.

(4) When radar is used to establish the final approach fix, inform the pilot that after being advised that he is over the fix he is to contact the tower on local control frequency.

794.d.(4) Example.—

"Three miles from final approach fix. Turn left heading zero one zero. Maintain two thousand until established on the localizer. Cleared for I-L-S- Runway Three Six Approach. I will advise when over the fix."

"Over final approach fix. Contact tower one one eight point one."

794.d.(4) Note.—ARSR may be used for establishment of initial approach and intermediate approach fixes only. ASR must be used to establish the final approach fix.

795. APPROACH SEPARATION RESPONSIBILITY

a. The radar controller performing the approach control function is responsible for separation of radar arrivals unless visual separation is provided by the tower, or a Letter of Agreement/Facility Directive authorizes otherwise. Radar final controllers ensure that established separation is maintained between aircraft under their control and other aircraft established on the same final approach course.

795.a. Note.—The radar controller may be a controller in an ARTCC, a terminal facility, or a tower controller when authorized to perform the approach control function in a terminal area.

795.a. Reference.—Visual Separation, 490; Radar Separation, 720; Wake Turbulence, 1400, 1420. 7210.3—212, Delegation of Radar Approach Control Authority to a Nonapproach Control Tower.

b. When timed approaches are being conducted, the radar controller shall maintain the radar separation specified in **453.** until the aircraft is observed to have passed the final approach fix inbound and is within 5 miles of the runway on the final approach course or until visual separation can be provided by the tower.

796. VISUAL APPROACHES

a. Vectors for a visual approach.

You may vector aircraft for a visual approach to the airport of intended landing if the following conditions are met:

796.a. Example.—

"Cessna Four Five Victor turn right heading three five zero. Vector for a Visual Approach to Yeager Airport (runway, if known)."

796.a. Note.—The center or approach control facility establishes an approach sequence for aircraft under their control. This sequence includes VFR aircraft where Stage II or III is provided or the pilot requests the service. The landing sequence is established by the tower.

796.a. Reference.—Approach sequence, 1261. Glossary (Visual Approach).

(1) At airports with weather reporting service—The reported ceiling at the airport of intended landing is 500 feet above the minimum vectoring altitude and visibility is 3 miles or more, or

(2) At airports without weather reporting service—The pilot reports that descent and flight to the airport can be made in VFR conditons, and

(3) Radar separation is provided from any preceding IFR/Stage III aircraft until visual separation is provided. Visual separation may be applied to these aircraft outside of a control zone.

b. Vectors for simultaneous approaches at tower controlled airports.

You may vector aircraft simultaneously for visual approaches while other aircraft are conducting any type approach to the same runway or another runway or airport if the conditions in **a.** are met.

c. Clearance for visual approach.

A radar controlled aircraft may be cleared for a visual approach provided: traffic conflicts with other aircraft have been resolved; the aircraft is and can remain in VFR conditions; and the tower is informed of the aircraft's position prior to communications transfer, and

796.c. Note.—ARTS functions may be used to inform the tower if a Facility Directive or Letter of Agreement specifies control and communications transfer points.

796.c. Reference.—Airport traffic areas, 32; Arrival Information by Approach Control Facilities, 392.

(1) An aircraft, not following another aircraft on approach, reports sighting the airport, or

(2) An aircraft reports sighting a preceding aircraft landing on the same runway and has been instructed to follow it, or

796.c.(2) Example.—"Cessna Five Six November, follow the heavy American DC-10. Cleared for a Visual Approach to Runway One. Caution, wake turbulence."

(3) An aircraft reports sighting a preceding aircraft making an approach to

parallel runway separated by less than 2,500 feet and all aircraft involved are informed that approaches are being conducted to the parallel runway (DO NOT PERMIT A HEAVY AIRCRAFT TO OVERTAKE ANOTHER AIRCRAFT), or

(4) An aircraft reports the airport but not the preceding aircraft in sight, provided radar separation is maintained or both aircraft are sighted by the local controller and visual separation is provided. In either case, wake turbulence separation must be applied as appropriate, or

796.c.(4) Reference.—Wake Turbulence, Chapter 6.

(5) When using converging runways or parallel runways separated by 2,500 feet or more, one of the conditions in paragraph **796.c.**(1), (2), or (4) must be present and all aircraft involved are informed that other arriving aircraft are using the other runway, and

796.c.(3) and (5) Note.—While conducting simultaneous visual approaches to parallel or converging runways, or visual approaches to one runway and instrument approaches to the other, separation must be maintained until the aircraft conducting the visual approach has received and acknowledged for a visual approach clearance.

(6) *USAF/USN NOT APPLICABLE:* When a charted visual approach procedure is used, specify the published name of the procedure and the landing runway in the clearance.

796.c.(6) Example.—"United Six Ten, cleared for Visual Bridge Approach, Runway Two Eight Right."

796.c.(6) Note.—USAF and USN aircraft do not have the charts and will not participate in charted visual approaches.

d. Continue radar monitoring and traffic information until the aircraft is instructed to contact the tower, the FSS, or on pilot request UNICOM or airline company radio when the destination airport is not tower controlled.

796.d. Note 1.—The point at which an aircraft is instructed to contact the tower will vary depending on the runway in use, weather, etc. It is determined by prior coordination between the tower/center controller. Ordinarily, the changover points are established far enough from the airport so that the tower controller can properly establish a landing sequence, normally prior to entering the airport traffic area.

796.d. Note 2.—When the destination is not a tower controlled airport, the aircraft may be released to advisory frequency after potential conflicts with known traffic have been resolved.

797. PARALLEL ILS APPROACHES

TERMINAL

When conducting parallel ILS approaches:

a. Provide a minimum of *1,000 feet* vertical or a minimum of *3 miles* radar separation between aircraft during turn-on.

b. Provide a minimum of *3 miles* radar separation between aircraft on the same localizer course.

c. Provide a minimum of *2 miles* radar separation between successive aircraft on adjacent localizer courses when the following conditions are met:

(1) Runway centerlines are at least 3,000 feet apart.

(2) Apply this separation standard only after aircraft are established on the localizers.

(3) Straight-in landings will be made.

(4) Missed approach procedures do not conflict.

(5) Aircraft are informed that approaches to both runways are in use. This information may be provided through the ATIS.

(6) Approach control shall have an override capability to local control at those locations where separation responsibility has not been delegated to the tower.

797.c.(6) Note.—The override capability is an integral part of this procedure when approach control has the sole separation responsibility.

797.c.(6) Reference.—Approach Separation Responsibility, 795. 7210.3-212, Delegation of Radar Approach Control Authority to a Nonapproach Control Tower.

Section 2. VISUAL SIGNALS

920. LIGHT SIGNALS

Use of air traffic control light signals from the **Table** to control aircraft and movement of vehicles, equipment, and personnel on the movement area when radio communications cannot be employed.

920. Reference.—7210.3—430.k.(1), Letters of Agreement.

920. Table.—ATC Light Signals.

	Meaning		
Color and type of signal	*Aircraft on the ground*	*Aircraft in flight*	*Movement of vehicles equipment and personnel*
Steady green	Cleared for take-off.	Cleared to land	Cleared to cross; proceed; go.
Flashing green	Cleared to taxi.	Return for landing (to be followed by steady green at the proper time).	Not applicable.
Steady red	Stop.	Give way to other aircraft and continue circling.	Stop.
Flashing red	Taxi clear of landing area/runway in use.	Airport unsafe—do not land.	Clear the taxiway/runway.
Flashing white	Return to starting point on airport.	Not applicable.	Return to starting point on airport.
Alternating red and green	General Warning Signal—Exercise Extreme Caution.		

921. WARNING SIGNAL

Direct a general warning signal to aircraft or vehicle operators, as appropriate, when:

921. Note.—The warning signal is not a prohibitive signal and can be followed by any other light signal, as circumstances permit.

a. Aircraft are converging and a collision hazard exists.

b. Mechanical trouble exists of which the pilot might not be aware.

c. Other hazardous conditions are present which call for intensified pilot or operator alertness. These conditions may include obstructions, soft field, ice on the runway, etc.

922. RECEIVER-ONLY ACKNOWLEDGEMENT

To obtain acknowledgement from an aircraft equipped with receiver only, request the aircraft to do the following:

a. Between sunrise and sunset:

(1) Move ailerons or rudders while on the ground.

(2) "Rock" wings while in flight.

b. Between sunset and sunrise—"Blink" navigation or landing lights.

923-939. RESERVED

Section 3. AIRPORT CONDITIONS

940. TIMELY INFORMATION

Issue airport condition information necessary for an aircraft's safe operation in time for it to be useful to the pilot. Include the following, as appropriate:

a. Construction work on or immediately adjacent to the movement area.

b. Rough portions of the movement area.

c. Braking conditions caused by ice, snow, slush, or water.

d. Snowdrifts or piles of snow on or along the edges of the area and extent of any plowed area.

e. Parked aircraft on the movement area.

f. Irregular operation of part or all of the airport lighting system.

g. Other pertinent airport conditions.

941. RUNWAY SURFACE

Issue to aircraft only factual information, as reported by the airport management concerning the condition of the runway surface, describing the accumulation of precipitation.

941. Example.—

"All runways covered by compacted snow six inches deep."

942. BRAKING ACTION

Furnish quality of braking action, as received from pilots or the airport management, to all aircraft as follows:

a. Describe the quality of braking action using the terms "good," "medium" (or "fair") "poor," or "nil." Additionally, the term "medium" (or "fair") may be combined with either "poor" or "good". If the pilot or airport management reports braking action in other than the foregoing terms, ask him to categorize braking action in these terms.

942.a. Note.—The term "nil" is used to indicate bad or no braking action.

b. Include type of aircraft or vehicle from which the report is received.

942.a. and b. Examples.—

"Braking action medium to poor, reported by a DC-10." "Braking action poor, reported by Electra."

→ **c.** On pilot request, furnish Mu-Meter information received from the airport management using the term "MU" followed by the number for each of the three runway segments, a word describing the cause of the runway friction problem, and the time of report.

942.c. Examples.—

"MU, eight, six, seven, snow at zero niner three zero."

"MU, thirty-five, twenty-six, thirty, sleet at one zero one five."

942.c. Note.—A runway friction measuring device, known as the "Mu-Meter," is used to provide runway surface friction measurements at a number of selected airports. Mu-Meter information is furnished to the tower by airport management for three segments of the runway. When the coefficient of friction is at or above .40, the reading is reported as a single digit; i.e., "six" denotes .60. The range of values below .40, indicating a deteriorating condition and possible hydroplaning, is given as a group number; i.e., "thirty-two" denotes .32.

943. RUNWAY SURFACE CONDITION/RUNWAY CONDITION READING

Issue the runway surface condition and/or the RCR, if provided, to all USAF and ANG aircraft. Issue the RCR to other aircraft upon pilot request.

943. Example.—

"Ice on runway, RCR zero five, patchy."

943. Note 1.—USAF has established RCR procedures for determining the average deceleration readings of runways under conditions of water, slush, ice, or snow. The use of RCR code is dependent upon the pilot's having a "stopping capability chart" specifically applicable to his aircraft.

943. Note 2.—USAF offices furnish RCR information at airports serving USAF and ANG aircraft.

943. Reference.—Airport Conditions, 401.

944-949. RESERVED

→ 950. ARRESTING SYSTEM OPERATION

a. For normal operations, arresting systems remotely controlled by air traffic control shall remain in the retracted or down position.

950.a. Note 1.—USN Runway Arresting Gear-Barriers are not operated by air traffic control personnel. Readiness/rigging of the equipment is the responsibility of the operations department.

950.a. Note 2.—A request to raise a barrier or hook cable means the barrier or cable on the departure end of the runway. If an approach end engagement is required, the pilot or military authority will specifically request that the approach end cable be raised.

Reference.—7610.4, 1561-1565.

b. Raise aircraft arresting systems whenever:

(1) Requested by a pilot.

950.b.(1) Note.—The standard emergency phraseology for a pilot requesting an arresting system to be raised for immediate engagement is "Barrier-Barrier-Barrier" or "Cable-Cable-Cable."

(2) Requested by military authority, e.g., airfield manager, supervisor of flying, mobile control officer, etc.

(3) A military jet aircraft is landing with known or suspected radio failure or conditions (drag chute/hydraulic/electrical failure, etc.) that indicate an arresting system may be needed. Exceptions are authorized for military aircraft which cannot engage an arresting system (C-9, C-141, C-5, T-39, etc.) and should be identified in a Letter of Agreement and/or appropriate military directive.

c. When requested by military authority due to freezing weather conditions or malfunction of the activating mechanism, the barrier/cable may remain in a raised position provided aircraft are advised.

Phraseology:

YOUR DEPARTURE/LANDING WILL BE TOWARD/OVER A RAISED BARRIER/CABLE ON RUNWAY (number), (location, distance, as appropriate).

d. Inform civil and U.S. Army aircraft whenever rubber supported cables are in place at the approach end of the landing runway, and include the distance of the cables from the threshold. This information may be omitted if it is published in the "Notices to Airmen" publication/DOD FLIP.

950.d. Example.—"Runway One Four arresting cable one thousand feet from threshold."

e. When arresting system operation has been requested, inform the pilot of the indicated barrier/cable position.

Phraseology:

(Ident) BARRIER/CABLE INDICATES UP/DOWN. CLEARED FOR TAKEOFF/TO LAND.

f. Time permitting, advise pilots of the availability of all arresting systems on the runway in question when a pilot requests barrier information.

g. If an aircraft engages in a raised barrier/cable, initiate crash alarm procedures immediately.

950.g. Note.—*USAF/USN:* For preplanned practice engagements not associated with emergencies, crash alarm systems need not be activated if—in accordance with local military operating procedures—all required notifications are made before the practice engagement.

951-959. RESERVED

Section 4. RUNWAY USE

960. SELECTION

Except where a "runway use" program is in effect, use the runway most nearly aligned with the wind when five knots or more or the "calm wind" runway when less than five knots (set tetrahedrons accordingly) unless use of another runway:

960. **Note.**—If a pilot prefers to use a runway different than that specified, he is expected to advise ATC.

960. **Reference.**—Order 7110.81, Runway Use Programs.

a. Will be operationally advantageous.

b. Is requested by the pilot.

961. TAILWIND COMPONENTS

When authorizing use of runways and a tailwind component exists, always state both wind direction and velocity.

961. **Note.**—The wind may be described as "calm" when appropriate.

962. STOL RUNWAYS

Use STOL runways as follows:

a. A designated STOL runway may be assigned only when requested by the pilot or as specified in a Letter of Agreement with an aircraft operator.

b. Issue the measured STOL runway length if the pilot requests it.

963. CALM WIND CONDITIONS

Describe the wind as calm when the wind velocity is less than three knots.

964-969. RESERVED

→ 1052. RUNWAY EDGE LIGHTS

Operate the runway edge light system/s serving the runway/s in use as follows:

a. Between sunset and sunrise, turn the lights on:

(1) For departures—Before an aircraft taxies onto the runway and until it leaves the airport traffic area.

(2) For arrivals—

(a) IFR aircraft—Before the aircraft begins final approach, or

(b) VFR aircraft—Before the aircraft enters the airport traffic area, and

(c) Until the aircraft has taxied off the landing runway.

b. Between sunrise and sunset, turn the lights on as in **a.** (1) and (2) above when the surface visibility is less than 2 miles.

c. As required by Facility Directives to meet local conditions.

d. Different than **a.**, **b.**, or **c.** above when:

(1) You consider it necessary, or

(2) Requested by a pilot and no other known aircraft will be adversely affected.

1952.d.(2) Note.—Pilots may request lights to be turned on or off contrary to **a.**, **b.**, or **c.** above. However, FAR 121 and 135 operators are required to land/takeoff on lighted runways/heliport landing areas at night.

1053. TAXIWAY LIGHTS

Operate taxiway lights serving the taxiways, or portions thereof, in use as follows:

a. Between sunset and sunrise—Before an aircraft taxies onto the taxiway (normally at the time taxi information is issued) and until it taxies off it.

b. At other times when you consider it necessary and as required by local instructions.

1054. SIMULTANEOUS APPROACH AND RUNWAY LIGHT OPERATION

Operate runway lights whenever the associated approach lights are in operation. If multiple runway light selection is not possible, you may leave the approach lights on and switch the runway lights to another runway to accommodate another aircraft.

1055. MALSR INTENSITY SETTINGS

Operate MALSR intensity controls not controlled by runway edge lights in accordance with the values in the **Tables** except:

a. When Facility Directives specify other settings to meet local atmospheric, topographic, and twilight conditions.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot's request.

1055. Table 1.—Two Step MALS/One Step RAIL

Step	*Visibility—(Applicable to runway served by lights)*	
	Day	*Night*
MALS HI/RAIL ON	Less than 3 miles	Less than 3 miles*
MALS LOW	When requested	3 miles or more

* At locations providing part-time control tower service, if duplicate controls are not provided in the associated FSS, the MALSR shall be set to low intensity during the hours of darkness when the tower is unmanned.

1055. Table 2.—Three Step MALS/Three Step RAIL

Step	*Visibility—(Applicable to runway served by lights)*	
	Day	*Night*
3	Less than 2 miles	Less than 1 mile
2	2 but not including 3 miles	1 to but not including 3 miles*
1	When requested	3 miles or more

* At locations providing part-time control tower service, if duplicate controls are not provided in the FSS on the airport, the air-to-ground radio link shall be activated during the hours of darkness when the tower is unmanned. If there is no radio air-to-ground control, the MALSR shall be set on intensity step #2 during the hours of darkness when the tower is unmanned. (See 7210.3—1253.)

1056. HIRL ASSOCIATED WITH MALSR

Operate HIRL which control the associated MALSR in accordance with the accompanying intensity setting **Table**, except:

a. As requested by the pilot.

b. As you deem necessary, if not contrary to the pilot's request.

1056. **Table.**—HIRL associated with MALSR

Step	*Visibility*	
	Day	*Night*
5	Less than 1 mile	When requested
4	1 to but not including 2 miles	Less than 1 mile
3	2 to but not including 3 miles	1 to but not including 3 miles
2	When requested	3 to 5 miles inclusive
1	When requested	More than 5 miles

1056. **Note.**—When going from a given brightness step setting to a lower setting, rotation of the brightness control to a point below the intended step setting and then back to the appropriate step setting will ensure that the MALSR will operate at the appropriate brightness.

1057-1059. RESERVED

1060. MEDIUM INTENSITY RUNWAY LIGHTS

Operate MIRL or MIRL which control the associated MALSR in accordance with the **Table** except:

a. As requested by the pilot.

b. As you deem necessary, if not contrary to the pilot's request.

1060. **Table.**—MIRL Intensity Setting

Step	*Visibility*	
	Day	*Night*
3	Less than 2 miles	Less than 1 mile
2	2 to 3 miles	1 to 3 miles
1	When requested	More than 3 miles

1060. **Reference.**—See 1056. Note.

1061. HIGH INTENSITY RUNWAY, RUNWAY CENTERLINE AND TOUCHDOWN ZONE LIGHTS

Operate high intensity runway and associated runway centerline and touchdown zone lights in accordance with the **Table**, except:

a. Where a Facility Directive specifies other settings to meet local conditions.

b. As requested by the pilot.

c. As you deem necessary, if not contrary to pilot request.

1061. **Table.**—HIRL, RCLS, TDZL Intensity Setting

Step	*Visibility*	
	Day	*Night*
5	Less than 1 mile*	When requested
4	1 to but not including 2 miles*	Less than 1 mile*
3	2 to but not including 3 miles	1 to but not including 3 miles*
2	When requested	3 to 5 miles inclusive
1	When requested	More than 5 miles

* and/or appropriate RVR/RVV equivalent.

1062. HIRL CHANGES AFFECTING RVR

Keep the appropriate approach controller or PAR controller informed, in advance if possible, of HIRL changes that affect RVR.

1063. HIGH SPEED TURNOFF LIGHTS

Operate high speed turnoff lights:

a. Whenever the associated runway lights are used for arriving aircraft. Leave them on until the aircraft has either entered a taxiway or passed the last light.

b. As required by Facility Directives to meet local conditions.

c. As requested by the pilot.

1064. RUNWAY END IDENTIFIER LIGHTS

When separate on-off controls are provided, operate runway end identifier lights:

a. When the associated runway lights are lighted. Turn the REIL off after:

(1) An arriving aircraft has landed.

(2) A departing aircraft has left the traffic pattern area.

(3) It is determined that the lights are of no further use to the pilot.

b. As required by Facility Directives to meet local conditions.

c. As requested by the pilot.

1065. VISUAL APPROACH SLOPE INDICATORS (VASI)

VASI systems with remote on-off switching shall be operated when they serve the runway in use and where intensities are controlled in accordance with the **Tables**, except:

a. As required by Facility Directives to meet local conditions.

b. As required by the pilot.

1065. Table 1.—VASI Intensity Setting Two Step System.

Step	*Period/Condition*
High	Day—Sunrise to sunset.
Low	Night—Sunset to sunrise.

1065. Table 2.—VASI Intensity Setting—Three Step System.

Step	*Period/Condition*
High	Day—Sunrise to sunset.
Medium	Twilight—From sunset to 30 minutes after sunset and from 30 minutes before sunrise to sunrise, and during twilight in Alaska.
	Note—During a 1 year period, twilight may vary 26 to 43 minutes between 25 and 49N latitude.
Low	Night—From 30 minutes after sunset to 30 minutes before sunrise.

1065. Note.—The basic FAA standard for VASI systems permits independent operation by means of photoelectric device. This system has no on-off control feature and is intended for continuous operation. Other VASI systems in use include those that are operated remotely from the control tower. These systems may consist of either a photoelectric intensity control with only an on-off switch, a two step intensity system, or a three step intensity system.

1065. Reference.—7210.3-1254, VASI Systems. Handbook 6850.2, Visual Guidance Lighting Systems.

1066-1079. RESERVED

Section 9. RUNWAY VISIBILITY

1080. FURNISH RVR/RVV VALUES

Where RVR or RVV equipment is operational, irrespective of subsequent operation or non-operation of navigational or visual aids for the application of RVR/RVV as a takeoff or landing minima, furnish the values for the runway in use in accordance with **1082.**

1080. Note.—RVR computer digital readouts are not compatible with some RVR minima. For example, Category IIIA minima is 700 feet, yet only 600 and 800 feet are reportable values in that range. Order 6560.10B, Runway Visual Range (RVR) specifies that the 800-foot reportable value covers a range from 701 feet to as high as 900 feet. Therefore, 800-foot RVR shall be used as a valid minimum indication for 700-foot RVR minima.

1080. Reference.—Order 6750.24, ILS Electronic Requirements.

1081. ARRIVAL/DEPARTURE RUNWAY VISIBILITY

a. Issue current touchdown RVR/RVV for the runway/s in use:

(1) When prevailing visibility is 1 mile or less regardless of the value indicated.

(2) When RVR/RVV indicates a reportable value regardless of the prevailing visibility.

1081.a.(2) Note.—Reportable values are: RVR 6,000 feet or less; RVV 1½ miles or less.

b. Issue mid/rollout RVR when the value of either is less than 2,000 feet and less than the touchdown value.

1082. TERMINOLOGY

a. Provide RVR/RVV information by stating the runway, the abbreviations RVR/RVV, and the indicated value. When issued along with other weather elements, transmit these values in the normal sequence used for weather reporting.

1082. Example.—

"Runway One Four R-V-R two thousand four hundred."

"Runway Three Two R-V-V three quarters."

b. Whe.. two or more RVR systems serve the runway in use, report the indicated values for the different systems in terms of touchdown, mid and rollout as appropriate.

1082.b. Example.—

"Runway Two Two Left R-V-R two thousand, rollout one thousand eight hundred."

"Runway Two Seven Right R-V-R one thousand, mid eight hundred, rollout six hundred."

c. When there is a requirement to issue an RVR or RVV value and a visibility condition greater or less than the reportable values of the equipment is indicated, state the condition as MORE than or LESS than the appropriate minimum or maximum readable value.

1082.c. Example.—

"Runway Three Six R-V-R more than six thousand."

"Runway Niner R-V-R one thousand, rollout less than six hundred."

d. When a readout indicates a rapidly varying visibility condition (1,000 feet or more for RVR; one or more reportable values for RVV), report the current value followed by the range of visibility variance.

1082.d. Example.—

"Runway Two Four R-V-R two thousand, variable one thousand six hundred to three thousand."

"Runway Three One R-V-V three-quarters, variable one-quarter to one."

1083-1099. RESERVED

Section 11. DEPARTURE SEPARATION

1110. SAME RUNWAY SEPARATION

Separate a departing aircraft from a preceding departing or arriving aircraft using the same runway by ensuring that it does not begin takeoff roll until:

1110. **Reference.**—Wake Turbulence, 1420.

a. The other aircraft has departed and crossed the runway end or turned to avert any conflict. If you can determine distances by reference to suitable landmarks, the other aircraft need only be airborne if the following minimum distance exists between aircraft:

(1) When only Category I aircraft are involved—*3,000 feet.*

(2) When a Category I aircraft is preceded by a Category II aircraft—*3,000 feet.*

(3) When either the succeeding or both are Category II aircraft—*4,500 feet.*

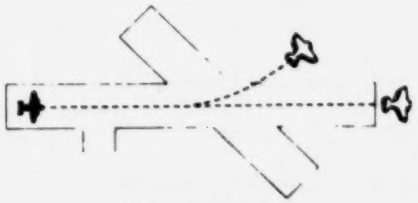
(4) When either is a Category III aircraft—*6,000 feet.*

1110.a. **Note.**—Aircraft Categories are as follows:

Category I—Light-weight, single-engine, personal-type propeller driven aircraft. (Does not include higher performance, single-engine aircraft such as the T-28.)

Category II—Light-weight, twin engine, propeller driven aircraft weighing 12,500 pounds or less such as the Aero Commander, Twin Beechcraft, DeHavilland Dove, Twin Cessna. (Does not include such aircraft as a Lodestar, Learstar, or DC-3.)

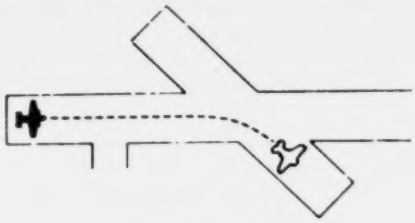
Category III—All other aircraft such as the higher performance single-engine, large twin-engine, four engine, and turbojet aircraft.



1110.a. Illustration 1

1110.a. Illustration 2

b. A preceding landing aircraft has taxied off the runway.



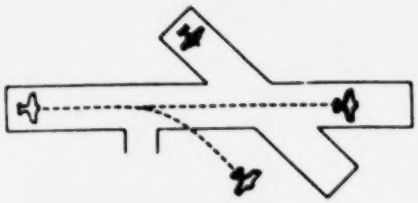
1110.b. Illustration

1111. INTERSECTING RUNWAY SEPARATION

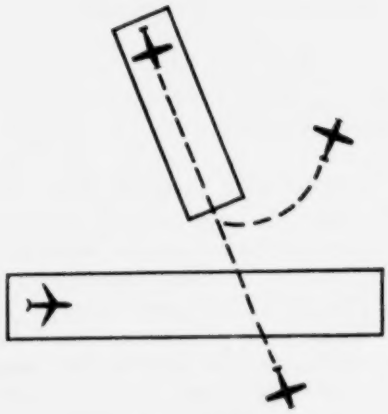
Separate departing aircraft from an aircraft using an intersecting runway, or nonintersecting runways when the flight paths intersect, by ensuring that the departure does not begin take-off roll until one of the following exists:

1111. **Reference.**—Wake Turbulence, 1426.

a. The preceding aircraft has departed and passed the intersection, has crossed the departure runway, or is turning to avert any conflict.

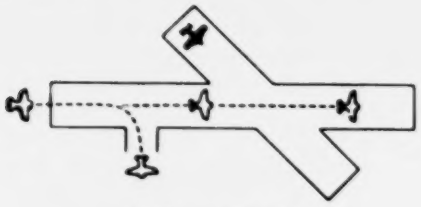


1111.a. Illustration 1

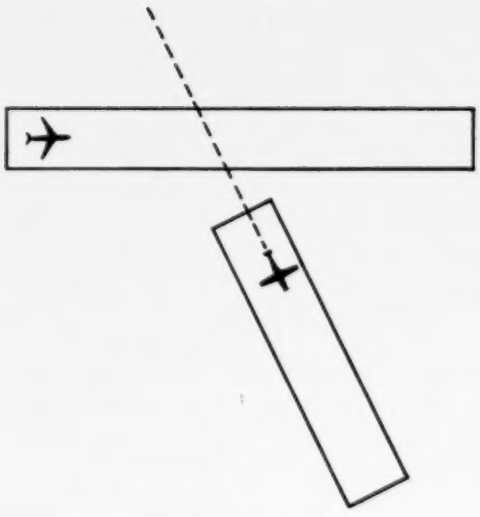


1111.a. Illustration 2

b. A preceding arriving aircraft has taxied off the landing runway, completed the landing roll and will hold short of the intersection, passed the intersection, or has crossed over the departure runway.



1111.b. Illustration 1



1111.b. Illustration 2

1112. ANTICIPATING SEPARATION

Takeoff clearance need not be withheld until prescribed separation exists if there is a reasonable assurance it will exist when the aircraft starts takeoff roll.

1113. INTERSECTION TAKEOFF SEPARATION

a. Separate a Category I or II aircraft taking off from an intersection on the same runway (same or opposite direction takeoff) behind a preceding departing nonheavy Category III aircraft by ensuring that it does not start takeoff roll until at least *3 minutes* after the Category III aircraft has taken off. Inform an aircraft when it is necessary to hold in order to provide the required *3-minute* interval.

Phraseology:
HOLD FOR WAKE TURBULENCE.

b. The *3-minute* interval is not required when:

(1) A pilot has INITIATED a request to deviate from that interval, or

(2) *USA/USAF NOT APPLICABLE.* The intersection is 500 feet or less from the threshold and both aircraft are taking off in the same direction.

1113.b.(1) Note.—A request for takeoff does not initiate a waiver request; the request for takeoff must be accomplished by a request to deviate from the *3-minute* interval.

c. When applying the provisions of **b.**:

(1) Issue a wake turbulence advisory before clearing the aircraft for takeoff.

(2) Do not clear the intersection departure for an immediate takeoff.

(3) When applying (1) or (2) above, issue a clearance to permit the trailing aircraft to deviate from course enough to avoid the flight path of the preceding nonheavy Category III departure.

(4) Separation requirements in accordance with **1110.a.** must also apply.

1113. Reference.—Wake Turbulence, 911; Intersection Takeoff, 993; Aircraft Categories, 1110.a. Note; Intersection Departure Minima, 1404 (Heavy Jet).

1114. OPPOSITE DIRECTION MINIMA

Separate a Category I or II aircraft behind a nonheavy Category III aircraft taking off or making a low/missed approach when utilizing opposite direction takeoffs on the same runway by *3 minutes* unless a pilot has INITIATED a request to deviate from the *3-minute* interval. In the latter case, issue a wake turbulence advisory before clearing the aircraft for takeoff.

1114. Note.—A request for takeoff does not initiate a waiver request; the request for takeoff must be accompanied by a request to deviate from the *3-minute* rule.

1114. Reference.—Wake Turbulence, 911; Aircraft Categories, 1110.a. Note; Opposite Direction Minima, 1402 (Heavy Jet).

a. Inform an aircraft when it is necessary to hold in order to provide the required *3-minute* interval.

Phraseology:
HOLD FOR WAKE TURBULENCE.

1115-1119. RESERVED

unless the runway or approach/runway lights are in sight or, if a "point-in-space" approach, unless able to proceed visually.

Phraseology:

(Distance) MILE/S FROM RUNWAY *or* OVER MISSED APPROACH POINT. IF RUNWAY, *or* APPROACH/RUNWAY LIGHTS NOT IN SIGHT, EXECUTE MISSED APPROACH/(missed approach instructions). (Additional instructions/clearance, as required).

(Distance and direction) FROM AIRPORT/HELIPORT/MISSED APPROACH POINT. IF UNABLE TO PROCEED VISUALLY, EXECUTE MISSED APPROACH. (Additional instructions/clearance, if required).

1195.d. Note.—Terminal Instrument Approach Procedures and Flight Inspection criteria require establishment of a MAP for each procedure including the point to which satisfactory radar guidance can be provided.

1196-1199. RESERVED

Section 17. PAR APPROACHES

1200. GLIDEPATH NOTIFICATION

Inform the aircraft when it is approaching glidepath (approximately 10 to 30 seconds before final descent).

Phraseology:

APPROACHING GLIDEPATH.

1201. DECISION HEIGHT (DH) NOTIFICATION

Provide the DH to any pilot who requests it.

Phraseology:

THE PUBLISHED DECISION HEIGHT IS (number of feet).

1201. DESCENT INSTRUCTION

When an aircraft reaches the point where final descent is to start, instruct it to begin descent.

Phraseology:

BEGIN DESCENT.

1203. GLIDEPATH AND COURSE INFORMATION

a. Issue course guidance and inform the aircraft when it is on glidepath and on course, and frequently inform the aircraft of any deviation from glidepath or course.

Phraseology:

HEADING (heading).
ON GLIDEPATH.
ON COURSE

or

SLIGHTLY/WELL ABOVE/BELOW GLIDEPATH.
SLIGHTLY/WELL LEFT/RIGHT OF COURSE.

1203.a. Note.—Controllers should not key the radio transmitter continuously during radar approaches to preclude a lengthy communications block. The decision on how often transmitters are unkeyed is the controller's prerogative.

b. Issue trend information as required, to indicate target position with respect to the azimuth and elevation cursors and to describe target movement as appropriate corrections are issued. Trend information may be modified by the terms 'RAPIDLY' or 'SLOWLY' as appropriate.

1203.b. Examples.—

"Going above/below glidepath."
"Going right/left of course."
"Above/below glidepath and coming down/up."
"Above/below glidepath and holding."
"Left/right of course and holding/correcting."

1204. DISTANCE FROM TOUCHDOWN

Inform the aircraft of its distance from touchdown at least once each mile on final approach.

Phraseology:

(Number of miles) MILES FROM TOUCHDOWN.

1205–1209. RESERVED

1210. DECISION HEIGHT

Inform the aircraft when it reaches the published decision height.

Phraseology:

AT DECISION HEIGHT.

→ 1211. POSITION ADVISORIES

a. Continue to provide glidepath and course information prescribed in **1203. a.** and **b.** until the aircraft passes over threshold.

1211. Note.—Glidepath and course information provided below decision height is advisory only. FAR 91.117 outlines pilot responsibilities for descent below decision height.

b. Inform the aircraft when it is passing over the approach lights.

Phraseology:

OVER APPROACH LIGHTS.

c. Inform the aircraft when it is passing over the landing threshold and inform it of its position with respect to the final approach course.

Phraseology:

OVER LANDING THRESHOLD; (position with respect to course).

1212. COMMUNICATION TRANSFER

Issue communications transfer instructions.

Phraseology:

CONTACT (terminal control function) (frequency, if required) AFTER LANDING.

1212. Note.—Communications transfer instructions should be delayed slightly until the aircraft is on the landing roll-out to preclude diversion of the pilot's attention during transition and touchdown.

1212. Reference.—Radio Communications Transfer, 26.

Chapter 6. WAKE TURBULENCE

Section 1. GENERAL

1400. APPLICATION

a. Apply the procedures in this chapter to aircraft operating behind heavy jets and, where indicated, to small aircraft behind large aircraft.

1400.a. Note.—Paragraph **1420.b.** specifies increased radar separation for small type aircraft landing behind large or heavy aircraft because of the possible effects of wake turbulence.

b. The separation minima shall continue to touchdown for all IFR aircraft not making a visual approach or maintaining visual separation.

c. *USAF:* Separate aircraft other than heavy jets operating behind a B–747, DC–10, L–1011 or C–5A—*10 miles* or *4 minutes.*

1401. DELETED

1402. OPPOSITE DIRECTION MINIMA

TERMINAL

Separate aircraft behind a heavy jet departing or making a low/missed approach when utilizing opposite direction takeoffs or landing on the same or parallel runways separated by less than 2500 feet—*3 minutes.*

1403. TOUCH-AND-GO OR LOW APPROACH

TERMINAL

Apply the pertinent portions of this chapter with respect to the arrival and departure phases of heavy jet touch-and-go or low approach operations.

1403. Reference.—Touch-and-Go or Stop-and-Go or Low Approach, 1101.

1404. INTERSECTION DEPARTURE MINIMA

TERMINAL

a. Separate an aircraft taking off from an intersection on the same runway (same or opposite direction takeoff), or parallel runways separated by less than 2500 feet, by ensuring that it does not start takeoff roll until at least *3 minutes* after the heavy jet has taken off.

1404.a. Reference—Intersection Takeoff Separation, 1113 (Non-heavy jet).

b. *USAF:* Separate a non-heavy aircraft taking off on the same runway behind a preceding departing B–747, DC–10, L–1011, C–5A by ensuring that it does not start takeoff roll until at least *4 minutes* after the preceding heavy jet has taken off.

1405. TAKEOFF OPERATIONS

TERMINAL

a. Do not issue clearances which imply or indicate approval of rolling takeoffs by heavy jet aircraft.

b. Do not issue clearances to a Category I or Category II aircraft to taxi into position and hold on the same runway behind a departing heavy jet aircraft to apply the necessary intervals in **1404.**, **1420.a.**, or **1426.a.**(1).

1405.b. Reference.—Aircraft Categories, 1110 Note. AC 90–23D, Wake Turbulence.

c. The minima in **1420.a.** may be applied in lieu of the *2–minute* requirement in **1426.a.** When the **1420.a.** minima are applied, ensure that the appropriate radar separation exists at or prior to the time an aircraft becomes airborne when taking off behind a heavy jet.

1406. GROUND OPERATIONS

TERMINAL

Avoid clearances which require heavy jet aircraft to use greater than normal taxiing power.

1406. Reference.—AC 90–23D, Wake Turbulence, paragraph 11.

1407–1419. RESERVED

Section 2. RADAR SEPARATION

1420. MINIMA

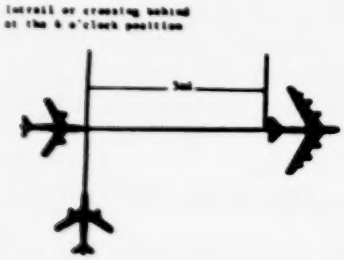
1420. Note.—Consider parallel runways less than 2,500 feet apart as a single runway because of the possible effects of wake turbulence.

a. Separate aircraft operating directly behind, or directly behind and less than 1,000 feet below, or following an aircraft conducting an instrument approach by:

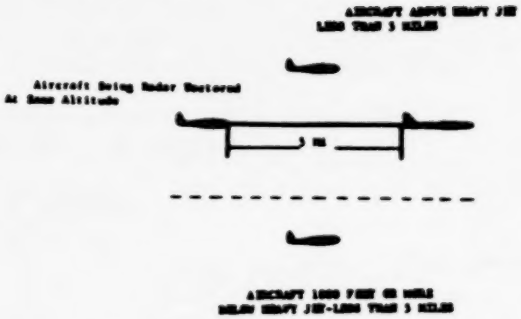
(1) Heavy behind heavy—*4 miles.*

(2) Small/large behind heavy—*5 miles.*

1420.a. Reference.—Takeoff Operations, 1405. Departure Minima, 1426.



1420.a. Illustration 1



1420.a. Illustration 2

b. *TERMINAL:* In addition to a., separate an aircraft landing behind another aircraft on the same runway, or one making a touch-and-go, stop-and-go, or low approach by ensuring the following minima will exist at the time the preceding aircraft is over the landing threshold:

(1) Small behind large—*4 miles.*

(2) Small behind heavy—*6 miles.*

1421-1424. RESERVED

1503. SAMP

Provide special handling to USAF aircraft engaged in aerial sampling missions (atmospheric sampling for nuclear contamination). Honor in-flight clearance requests for altitude and route changes to the maximum extent possible. Other IFR aircraft may be recleared so that requests by SAMPLER aircraft are honored. Separation standards as outlined in this handbook shall be applied in all cases.

1503. **Reference.**—Operational Priority, 24; Aircraft Identification, 87. 7210.3-633, Atmospheric Sampling for Nuclear Contamination.

1504. FLYNET

Provide expeditious handling for civil or military aircraft using the code name "Flynet." Relay the code name as an element in the remarks position of the flight plan.

1504. **Note.**—The code name "Flynet" indicates that an aircraft is transporting a Nuclear Emergency Team or a Disaster Control Team to the location of a nuclear accident or a major accident involving chemical agents or biological research materials. It is in the public interest that they reach their destination as rapidly as possible.

1504. **Reference.**—7610.4—1522.

1505. MINIMUM FUEL

If an aircraft declares a state of "minimum fuel," inform any facility to whom control jurisdiction is transferred of the minimum fuel problem and be alert for any occurrence which might delay the aircraft en route.

1505. **Note.**—Use of the term "minimum fuel" indicates recognition by a pilot that his fuel supply has reached a state where, upon reaching destination, he cannot accept any undue delay. This is not an emergency situation but merely an advisory that indicates an emergency situation is possible should any undue delay occur. Common sense and good judgment will determine the extent of special handling to be given in such situations.

1506. SAC EVASIVE ACTION MANEUVER

EN ROUTE

Approve a pilot request to conduct a SAC Evasive Action maneuver only on the basis of a permissible traffic situation. Specify the following items, as necessary, when issuing approval:

1506. **Note.**—The SAC "Evasive Action" maneuver is performed by SAC bomber/fighter bomber aircraft at or above FL 250 along a 60 NM long segment of the flight plan route overlying a RBS or other site and includes:

a. Flying a zigzag pattern on *both* the left and right side of the flight plan route centerline. Altitude deviations are made in conjunction with the lateral maneuvering.

b. Lateral deviations from the route centerline will not normally exceed 12 miles. Altitude variations shall not exceed plus or minus 1,000 feet of the assigned flight level (i.e., confined within a 2,000 foot block).

a. Specific route segment on which the maneuver will take place.

b. Distance of maximum route deviation from the centerline in miles.

c. Altitude.

Phraseology:

CLEARED TO CONDUCT EVASIVE ACTION MANEUVER FROM (fix) TO (fix)

and

(number of miles) EITHER SIDE OF CENTERLINE

and

MAINTAIN (altitude) THROUGH (altitude)

and

COMPLETE MANEUVER AT (fix) AT (altitude).

1507. SAC MITO OPERATIONS

a. Control MITO operations on the basis that MARSA is applicable between MITO aircraft until approved separation is established by the aircraft and acknowledged for by ATC.

1507.a. **Note 1.**—ATC is not responsible for providing separation during any portion of a MITO operation for which VFR flight has been requested and approved.

1507.a. **Note 2.**—A MITO operation begins at the takeoff roll and ends at a designated fix or cruising altitude. Use of these procedures does not authorize priority handling of these aircraft.

b. *TERMINAL:* Provide aircraft with at least the requested takeoff interval between departures as specified in a Letter of Agreement covering the MITO operation.

c. *TERMINAL:* Issue takeoff clearance on the departure frequency established in accordance with one of the following in the order listed:

(1) Discrete frequency common to both tower and RAPCON.

(2) RAPCON frequency if the tower has "override" capability.

(3) If neither of the preceding exists, tower frequency until airborne and changed to RAPCON.

d. Clear aircraft which will use MITO procedures, then fly in formation en route, to the breakup fix as the clearance limit.

e. Forward data pertaining to altitude or route beyond the breakup point to the center concerned as a part of the routine flight plan information.

f. *EN ROUTE:* If the breakup occurs in your area, issue an appropriate clearance to authorize transition from formation to individual route or altitude or to continue flight as a formation by the route filed by the lead aircraft until such time as breakup may be approved.

→ 1508. IFR MILITARY TRAINING ROUTES

A. Except for aircraft operating in the same altitude reservation, clear aircraft into an MTR provided separation will be applied between successive aircraft unless otherwise covered in a Letter of Agreement between the military scheduling activity and the concerned ATC facility.

Phraseology:
CLEARED INTO IR (designator).
MAINTAIN (altitude)
or
MAINTAIN IR (designator) ALTITUDE/S
or
MAINTAIN AT OR BELOW (altitude)
or
CRUISE (altitude)
and, if required
CROSS (fix) AT OR LATER THAN (time).

b. Unless otherwise covered in a Letter of Agreement between the military scheduling activity and the concerned FAA facility, clear aircraft to exit an MTR.

Phraseology:
CLEARED TO (destination/clearance limit) FROM IR (designator/exit fix) VIA (route). MAINTAIN (altitude).

c. If the provisions of **a.** above cannot be accomplished, MTRs may be designated for MARSA operations. To preclude an inadvertent compromise of MARSA standards by ATC, appropriate MARSA application for such routes shall be covered in a Letter of Agreement with the military scheduling activity. Establish separation between aircraft as soon as practicable after operation on the designated MARSA route is ended.

1508.c. Note.—For designated MARSA routes, the military assumes responsibility for separation for MTR aircraft that have passed the primary/alternate entry fix until separation is established by ATC after operations on the MARSA route are completed.

d. The lateral airspace to be protected along an MTR is the designated width of the route.

e. Prior to an aircraft entering an MTR, request the pilot's estimate for the route's exit/alternate exit fix, his requested altitude after exiting, and, if applicable, the number of reentries on a Strategic Training Range (STR).

Phraseology:
(Call sign) CONFIRM YOUR EXIT FIX ESTIMATE AND REQUESTED ALTITUDE AFTER EXIT AND, *if applicable,* THE NUMBER OF RE-E N T R I E S .

f. Forward estimates for exit/alternate exit fixes, requested altitude after exit, and, if applicable, the number of reentries on the STR.

g. Apply the procedures of **255.**, Nonreceipt of Position Report, based upon the pilot's estimate for the route exit fix.

h. Clearance may be issued to amend or restrict operations on a route for ATC considerations. Where a route has been designated MARSA in accordance with **c.** above, ATC shall not amend or restrict operations in such a manner as to compromise MARSA provisions.

1508.h. Note.—When MARSA is provided through route scheduling and circumstances prevent the pilot from entering the route within established time limits, it shall be the responsibility of the pilot to inform the ATC facility and advise his intentions.

i. If an aircraft on an IR experiences a two-way radio communications failure and you are unable to determine the aircraft is proceeding VFR in accordance with FAR 91.127(b) or the aircraft has not been positively radar identified:

(1) Provide separation to the destination airport based on the aircraft complying with the following:

(a) Maintain to the exit/alternate exit fix the higher of the following altitudes:

(i) The minimum IFR altitude for each of the remaining route segment/s remaining on the route.

(ii) The highest altitude assigned in the last ATC clearance.

(b) Depart the exit/alternate exit fix at the appropriate altitude specified in (a) above then climb/descend to the altitude filed in the flight plan for the remainder of the flight, or

1508.i.(1)(b) **Note.**—In the event of a two-way communications failure, ATC will be based on the following anticipated pilot action at the exit fix. Unless otherwise covered in a Letter of Agreement, and if the pilot is unable to comply with the VFR provisions of FAR 91.127/FLIP IFR Supplement, the pilot will exercise his emergency authority, squawk transponder Code 7700, depart the exit/alternate exit fix and climb/descend (continuing to squawk 7700) to the altitude filed in the flight plan. Subsequent transponder operations will be in accordance with **paragraph 1603**. Air traffic controller action from the exit fix is as prescribed in **paragraph 1550**.

(c) Proceed in accordance with the lost communication procedure contained in Letters of Agreement.

(2) Continue to monitor the last ATC assigned discrete code.

1508.i.(2) **Note.**—Pilots who experience a two-way radio failure will adjust their transponder to Code 7700 during climb/descent to altitude filed for the next leg of the flight plan; then change to Code 7600 for a period of 15 minutes. At the end of each 15-minute period, he will squawk 7700 for a period of 1 minute; all other times he will squawk 7600.

1509-1510. RESERVED

1511. CELESTIAL NAVIGATION TRAINING

EN ROUTE

a. Approve flight plans specifying celestial navigation only when it is requested for USAF or USN aircraft.

1511.a. **Note.**—An ATC clearance must be obtained by the pilot before discontinuing conventional navigation to begin celestial navigation training. The pilot will advise when discontinuing celestial navigation and resuming conventional navigation. Celestial navigation training will be conducted within 30 NM of the route centerline specified in the en route clearance unless otherwise authorized by ATC. During celestial navigation training, the pilot will advise ATC before initiating any heading changes which exceed 20 degrees.

b. Within conterminous U.S. airspace, limit celestial navigation training to transponder equipped aircraft within areas of ARTCC radar coverage.

c. Prior to control transfer, insure that the receiving controller is informed of the nature of the celestial navigation training leg.

1512. SAC GIANT LANCE OPERATIONS

EN ROUTE

Provide the following to Giant Lance flights at all times when aircraft are within radar coverage:

1512. **Note.**—SAC has a continuing requirement to conduct Giant Lance flights under peacetime conditions. These flights shall be identified by CARF notification to activate prepositioned Giant Lance ALTRVs. Since the number and status of Giant Lance flights may vary with emergency readiness conditions, CARF will inform all concerned ARTCCs of the current Giant Lance ALTRV in effect and any changes thereto.

a. Radar flight following.

b. Traffic information, except when operating in positive controlled airspace.

c. Advisory information whenever two or more Giant Lance aircraft are observed with less than 15 miles separation except when a rendezvous or cell formation flight is in progress.

d. Close adherence to preplanned routes except for routine changes requested by the pilot.

1513. MILITARY AERIAL REFUELING

EN ROUTE

Authorize aircraft to conduct aerial refueling along published or special tracks at their flight plan altitude, unless otherwise requested.

Phraseology:

CLEARED TO CONDUCT REFUELING:
ALONG (number) TRACK
or
FROM (fix) TO (fix)
and
MAINTAIN REFUELING LEVEL (altitude)
or
MAINTAIN (altitude)
or
COMMENCING AT (altitude), DESCENDING TO (altitude).

1513. **Note 1.**—During aerial refueling, tanker aircraft are responsible for receiver aircraft communication with ATC and for their navigation along the track.

1513. **Note 2.**—Aerial refueling airspace is not sterilized airspace and other aircraft may transit this airspace provided vertical or lateral separation is provided from refueling aircraft.

1513. **Note 3.**—MARSA begins between the tanker and receiver when the tanker and receiver/s have entered the air refueling airspace and the tanker advises ATC that he is accepting MARSA.

1513. **Note 4.**—MARSA ends between the tanker and receiver when the tanker advises ATC that the tanker and receiver aircraft are vertically positioned within the air refueling airspace and ATC advises MARSA is terminated.

1513. **Reference.**—Use of Marsa, 13; Formation Flight Aircraft and Other Aircraft, 745. 7610.4, Part 8, Aerial Refueling.

(2) **281**, Minima Along Other Than Established Airways or Routes. Protect the airspace *25 miles* either side of the route centerline. For turns by supersonic aircraft, protect the airspace *75 miles* on the overflown side and *25 miles* on the other side. For turns by subsonic aircraft, protect the airspace *34 miles* on the overflown side and *25 miles* on the other side.

g. A deviation to **654.**, Primary Radar Identification Methods, and **655.**, Beacon Identification Methods, is authorized for R-71/F-12 aircraft operating supersonically where positive identification is apparent because of the high speed target definition and the relative small number of aircraft involved.

1516. EXPERIMENTAL AIRCRAFT OPERATIONS

TERMINAL

a. When notified that an experimental aircraft intends to land or depart, take the following action:

1516.a. Note.—FAR 91.42(d)(3) requires that each person operating an aircraft with an experimental certificate shall notify the control tower of the experimental nature of the aircraft when operating into or out of airports with operating control towers.

(1) If notified of any special handling requirements, clear the aircraft according to pilot requests as traffic permits and if not contrary to ATC procedures.

(2) Once approved, do not ask the pilot to deviate from his planned action except to preclude an emergency situation.

b. At locations where volume or complexity of experimental aircraft operations warrant, a Letter of Agreement may be consummated between the facility and operator.

1517. FAA RESEARCH AND DEVELOPMENT FLIGHTS

When coordinated in advance and traffic permits, approve requests for special flight procedures from aircraft participating in FAA research and development test activities. These special procedures shall be applied to participating aircraft/vehicles.

1517. Note.—Special flight procedures for FAA research and development test activities must be approved by the facility chief prior to their use.

1517. Reference.—7210.3-624, Research and Development Flights.

1518. INTERCEPTOR OPERATIONS

Provide service to military interceptor aircraft in accordance with the policies and procedures in 7610.4, Special Military Operations, Part 6.

1518. Note.—The FAA and the military have mutually agreed to the implementation of policies and procedures for control of air defense interceptor operations. Effective coordination and cooperation between FAA and the military at all levels are essential if policy objectives are to be met.

1519. RESERVED

→ Section 6. SEA LANE OPERATIONS

1520. APPLICATION

Where Sea Lanes are established and controlled, apply the provisions of this section in lieu of the procedures contained in **Chapter 5, Sections 11** and **12.**

1521. DEPARTURE SEPARATION

Separate a departing aircraft from a preceding departing or arriving aircraft using the same sea lane by ensuring that it does not commence takeoff until:

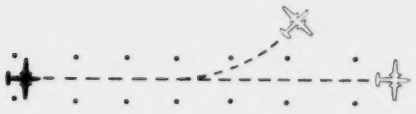
a. The other aircraft has departed and crossed the end of the sea lane or turned to avert any conflict. If you can determine distances by reference to suitable landmarks, the other aircraft need only be airborne if the following minimum distance exists between aircraft:

(1) When only Category I aircraft are involved—*1,500 feet.*

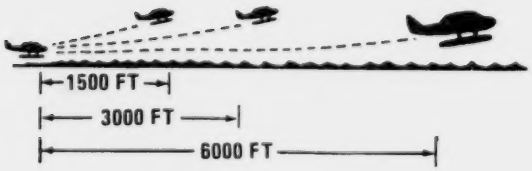
(2) When a Category I aircraft is preceded by a Category II aircraft—*3,000 feet.*

(3) When either the succeeding or both are Category II aircraft—*3,000 feet.*

(4) When either is a Category III aircraft—*6,000 feet.*



1521.a. Illustration 1.



1521.a. Illustration 2.

b. A preceding landing aircraft has taxied out of the sea lane.

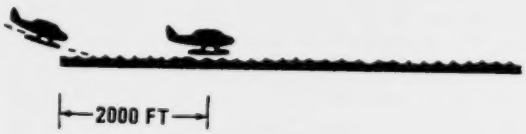
1521. Note.—Due to the absence of braking capability, caution should be exercised when instructing a float plane to hold a position as the aircraft will continue to move because of prop generated thrust. Clearance to taxi into position and hold should, therefore, be followed by takeoff or other clearance as soon as practicable.

1522. ARRIVAL SEPARATION

Separate an arriving aircraft from another aircraft using the same sea lane by ensuring that the arriving aircraft does not cross the landing threshold until one of the following conditions exists:

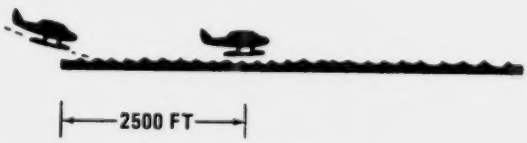
a. The other aircraft has landed and taxied out of the sea lane. Between sunrise and sunset, if you can determine distances by reference to suitable landmarks and the other aircraft has landed, it need not be clear of the sea lane if the following minimum distance from the landing threshold exists:

(1) When a Category I aircraft is landing behind a Category I or II—*2,000 feet.*



1522.a.(1) Illustration.

(2) When a Category II aircraft is landing behind a Category I or II—*2,500 feet.*



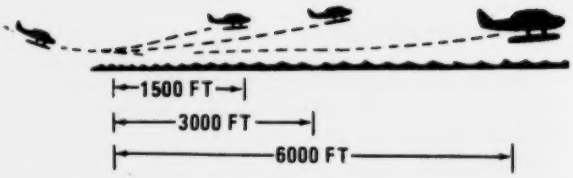
1522.a.(2) Illustration.

b. The other aircraft has departed and crossed the end of the sea lane or turned to avert any conflict. If you can determine distances by reference to suitable landmarks and the other aircraft is airborne, it need not have crossed the end of the sea lane if the following minimum distance from the landing threshold exists:

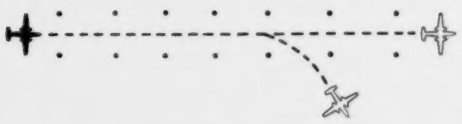
(1) When only Category I aircraft are involved—*1,500 feet.*

(2) When either is a Category II aircraft—*3,000 feet.*

(3) When either is a Category III aircraft—*6,000 feet.*



1522.b Illustration 2.



1522.b. Illustration 1.

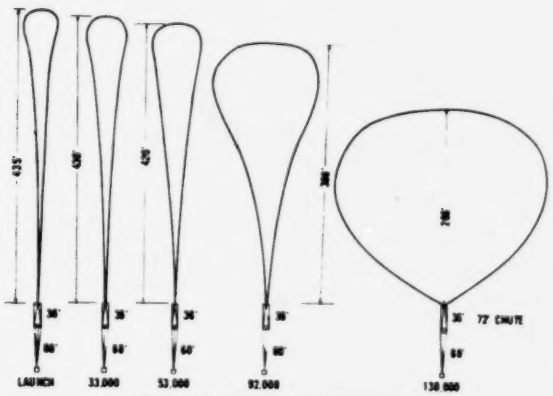
1523-1529. RESERVED

Section 7. UNMANNED FREE BALLOONS

1530. APPLICATION

Apply the following procedures, as appropriate, when unmanned free balloons are within airspace for which you have control jurisdiction:

1530. Note.—These procedures apply to unmanned free balloons that carry payloads as described in FAR 101.1(a)(4). Payloads may weigh several hundred pounds and the physical shape of the balloons change at various altitudes/flight levels. Balloon and payload ascend at an average rate of 400 feet a minute. Over the descent area, the payload is normally released from the balloon and descends by parachute at a minimum rate of 1,000 feet a minute. The balloon is normally deflated automatically when the payload is released. The operator is required to advise ATC one hour in advance of descent in accordance with FAR 101.39.



SHAPES OF 11 MILLION CUBIC FEET BALLOON AT VARIOUS ALTITUDES

1530. Illustration

a. Post the balloon flight on flight progress strips along the planned trajectory and revise routing as tracking/position reports require.

1530.a. Note.—The prelaunch notice information should be posted on flight progress strips for planing and operational purposes.

b. Radar flight follow balloons to the extent that equipment capabilities permit. If radar flight following is not possible, tracking should be attempted by communication with the "chase plane," telephone contact with the operator, pilot, or ground observation reports.

1530.b. Note.—Some operators have equipped their balloons with transponder beacons in addition to a radar reflection device or material required by FAR 101.35. But at cruise altitude, the balloon's communications equipment and transponder, if so equipped, are operated intermittently to conserve battery energy.

c. With pilot concurrence, provide separation between aircraft and balloons when you are satisfied that the balloon information is sufficiently reliable to provide the service. Do not attempt to separate aircraft from the balloon by using vertical separation unless you have accurate balloon altitude information.

d. Provide traffic advisories to all affected aircraft during initial contact specifying the balloon's known or estimated position, direction of movement, and altitude as "unknown" or "reported," as appropriate.

1530.d. Note.—Unless ATC requires otherwise, operators of unmanned free balloons are required to monitor the course of the balloon and record its position at least every two hours. Except as required in FAR 101.39(h), balloon position reports are not forwarded by the operator unless requested by the ATC.

Phraseology:

UNMANNED FREE BALLOON OVER (name of location)

or

ESTIMATED OVER (name of location), MOVING (direction of movement).

LAST REPORTED ALTITUDE AT (altitude as reported by the operator or determined from pilot report)

or

ALTITUDE UNKNOWN.

e. Transfer flight following responsibility between facilities or between controllers by forwarding the following information when available:

1530.e. Reference.—FAR 101.37, Notice Requirements. FAR 101.39, Balloon Position Report.

(1) Identification and type, e.g., Flight 804 Balloon.

(2) Last known position and altitude of balloon.

(3) General direction of movement and speed.

(4) ETA over facility boundary, sector boundary or other point if believed to be reasonably accurate.

(5) Other pertinent information.

(6) If in radar contact, physically point out the target to the receiving controller.

(7) The name and address (if available) of the operator and the telephone number of the location where tracking is being accomplished.

1531. DERELICT BALLOONS

Balloons become derelict when a moored balloon slips its mooring and becomes a hazard to air navigation, or when an unmanned free balloon flight cannot be terminated as planned. When this occurs:

a. In the case of a moored balloon which has slipped its moorings, issue traffic advisories.

1531. Reference.—7210.3-652, Derelict Balloons.

b. In the case of an unmanned free balloon, flight follow the balloon and, to the extent possible, provide aircraft under your control separation from the balloon.

c. Forward balloon position information received from pilot reports or derived from radar returns to your supervisor for further dissemination.

d. If radar contact of the balloon is lost, broadcast an advisory to all aircraft operating in the airspace affected by the derelict balloon at 10 minute intervals continuing until the derelict balloon is no longer a factor.

Phraseology:

ADVISORY TO ALL AIRCRAFT, DERELICT BALLOON REPORTED IN THE VICINITY OF (location), *or* ESTIMATED IN VICINITY OF (location), *or* REPORTED OVER (location)

or

RADAR OBSERVED OVER (location).

LAST REPORTED ALTITUDE AT (altitude as reported by operator or pilot report)

or

ALTITUDE UNKNOWN.

e. Transfer flight following responsibility as outlined in **1530.e.**

1532-1539. RESERVED

Section 8. JETTISONING OF EXTERNAL STORES

1540. JETTISONING OF EXTERNAL STORES

At locations where a drop area has been established for radar assistance in jettisoning of external stores, provide vectoring service upon request to:

1540. Note 1.—Where required, a mutually satisfactory drop area for the jettisoning of external stores will be determined by radar-equipped towers and centers in cooperation with the local USAF units, Air Division, or civil operators and civil aircraft companies concerned.

1540. Note 2.—FAA and Headquarters, USAF, have agreed to allow FAA facilities to vector USAF, Air Force Reserve, and Air National Guard aircraft for jettisoning of all external stores, i.e., tip tanks, JATO racks, special weapons, etc. Any similar vectoring service given to civil operators and civil aircraft companies operating Air Force type aircraft requires written agreement between the FAA and the user to relieve the FAA of possible liability. The Regional Attorney's office acts for FAA in executing this agreement.

a. USAF, ANG, and Air Force Reserve aircraft at any time.

b. Civil operators and civil aircraft when a written agreement is in effect for your location.

1541-1549. RESERVED

ing and Airport Search Directory." For flights with over-seas departure points, the information is available through the destination FSS or the appropriate IFSS.

b. Upon receipt of an INREQ or ALNOT, check the position records to determine whether the aircraft has contacted your facility. Notify the orginator of the results or status of this check within one hour of the time the alert was received. Retain the alert in an active status, and immediately notify the originator of subsequent contact, until cancellation is received.

1582. RESPONSIBILITY TRANSFER TO RCC

EN ROUTE

Transfer responsibility for further search to the RCC when one of the following occurs:

a. Thirty minutes have elapsed after the estimated aircraft fuel exhaustion time.

b. The aircraft has not been located within one hour after ALNOT issuance.

c. The ALNOT search has been completed with negative results.

1583. AIRCRAFT POSITION PLOTS

Plot the flight path of the aircraft on a chart, including position reports, predicted positions, possible range of flight, and any other pertinent information. Solicit the assistance of other aircraft known to be operating near the aircraft in distress. Forward this information to the RCC or ARTCC, as appropriate.

1584. ALNOT CANCELLATION

EN ROUTE

Cancel the ALNOT when the aircraft is located or the search is abandoned.

1585. HIJACKED AIRCRAFT

When you observe a Mode 3/A Code 7500, do the following:

1585. Note 1.—Military facilities will notify the appropriate FAA ARTCC, or the host nation agency responsible for en route control, of any indication that an aircraft is being hijacked. They will also provide full cooperation with the civil agencies in the control of such aircraft.

1585. Note 2.—*EN ROUTE:* During narrowband radar operations, code 7500 causes HIJK to blink in the data block.

1585. Note 3.—Only nondiscrete code 7500 will be decoded as the hijack code.

a. Acknowledge and confirm receipt of Code 7500 by asking the pilot to verify it. If the aircraft is not being subjected to unlawful interference, the pilot should respond to the query by broadcasting in the clear that he is not being subjected to unlawful interference. If the reply is in the affirmative or if no reply is received, do not question the pilot further but be responsive to the aircraft requests.

Phraseology:

(Identification) (name of facility) VERIFY SQUAWKING 7500.

1585.a. Note.—Code 7500 is only assigned upon notification from the pilot that his aircraft is being subjected to unlawful interference. Therefore, pilots have been requested to refuse the assignment of code 7500 in any other situation and to inform the controller accordingly.

b. Notify supervisory personnel of the situation.

1585.b. Reference.—7210.3-580, Forcible Seizure of Aircraft.

c. Flight follow aircraft and use normal handoff procedures without requiring transmissions or responses by aircraft unless communications have been established by the aircraft.

d. If aircraft are dispatched to escort the hijacked aircraft, provide all possible assistance to the escort aircraft to aid in placing them in a position behind the hijacked aircraft.

1585.d. Reference.—7610.4, Part 11, Chapter 30.

e. To the extent possible, afford the same control service to the aircraft operating VFR observed on the hijack code.

1586-1589. RESERVED

1590. VFR AIRCRAFT IN WEATHER DIFFICULTY

If a VFR aircraft requests assistance when it encounters or is about to encounter IFR weather conditions, request the aircraft to contact the appropriate control facility. Inform that facility of the situation. If the aircraft is unable to communicate with the control facility, relay information and clearances.

1591. RADAR ASSISTANCE TO VFR AIRCRAFT IN WEATHER DIFFICULTY

a. If a VFR aircraft requests radar assistance when it encounters or is about to encounter IFR weather conditions, ask the pilot if he is qualified for and capable of conducting IFR flight.

b. If the pilot states he is qualified for and capable of IFR flight, request him to file an IFR flight plan and then issue clearance to destination airport, as appropriate.

c. If the pilot states he is not qualified for or not capable of conducting IFR flight, or if he refuses to file an IFR flight plan, take whichever of the following actions is appropriate:

(1) Inform the pilot of airports where VFR conditions are reported, provide other available pertinent weather information, and ask if he will elect to conduct VFR flight to such an airport.

(2) If the action in (1) is not feasible or the pilot declines to conduct VFR flight to another airport, provide radar assistance if the pilot:

(a) Declares an emergency.

(b) Refuses to declare an emergency and you have determined the exact nature of the radar services the pilot desires.

(3) If the aircraft has already encountered IFR conditions, inform the pilot of the minimum safe altitude. If the aircraft is below the minimum safe altitude and sufficiently accurate position information has been received or radar identification is established, furnish a heading or radial on which to climb to reach the minimum safe altitude.

1592. RADAR ASSISTANCE TECHNIQUES

Using the following techniques to the extent possible when you provide radar assistance to a pilot not qualified to operate in IFR conditions:

a. Avoid radio frequency changes except when necessary to provide a clear communications channel.

b. Make turns while the aircraft is in VFR conditions so it will be in a position to fly a straight course while in IFR conditions.

c. Have pilot lower gear and slow aircraft to approach speed while in VFR conditions.

d. Avoid requiring a climb or descent while in a turn if in IFR conditions.

e. Avoid abrupt maneuvers.

f. Vector aircraft to VFR conditions.

1593. EMERGENCY LOCATOR TRANSMITTER (ELT) SIGNALS

When an ELT signal is heard or reported:

a. *EN ROUTE:* Notify the Rescue Coordination Center (RCC).

b. *TERMINAL:* Notify the ARTCC which will coordinate with the Rescue Coordination Center (RCC).

1593.a. and b. Note 1.—Operational ground testing of Emergency Locator Transmitters (ELTs) has been authorized during the first 5 minutes of each hour. To avoid confusing the tests with an actual alarm, the testing is restricted to no more than three audio sweeps.

1593.a. and b. Note 2.—Controllers can expect pilots to report aircraft position and time the signal was first heard, aircraft position and time the signal was last heard, aircraft position at maximum signal strength, flight altitude, and frequency of the emergency signal (121.5/243.0). (See Airman's Information Manual, paragraph 442.)

c. *EN ROUTE:* Request DF Net attempt to obtain fixes or bearings on signal. Forward bearings or fixes obtained plus any other pertinent information to the RCC.

d. *TERMINAL:* Attempt to obtain fixes or bearings on the signal.

e. Solicit the assistance of other aircraft known to be operating in the signal area.

f. *TERMINAL:* Forward fixes or bearings and any other pertinent information to the ARTCC.

1593.f. Note.—Fix information in relation to a VOR or VORTAC (radial-distance) facilitates accurate ELT plotting by RCC and should be provided when possible.

Section 5. MISCELLANEOUS OPERATIONS

1640. NAVY FLEET SUPPORT MISSIONS

When you receive information concerning an emergency to a U.S. Navy "Special Flight Number" aircraft, do the following:

a. Handle Navy Fleet Support Mission aircraft as follows:

(1) *EN ROUTE:* Relay immediately, via collect telephone call, all pertinent information to the Fleet Support Squadron On-Duty Officer at Norfolk, Virginia, telephone 703-444-4915.

(2) *TERMINAL:* Inform the nearest center of all the pertinent information.

b. Relay the words "Special Flight Number" followed by the number given as part of the routine IFR flight information.

c. Honor pilot requests for changes to route, altitude, and destination whenever possible.

1641. "DUTCH" AND "ASPEN" AIRCRAFT

If an aircraft (USAF YF-12A or SR-71) using the call sign "Dutch" or "Aspen" reports inflight difficulty or declares an emergency (by direct communications or relay from another facility), in addition to normal emergency handling of the aircraft, take the following action:

a. *EN ROUTE:* Forward the report as follows:

(1) For "Dutch" aircraft—Call Los Angeles Center on FTS telephone 799-1101 or 947-4101 or use AUTOVON.

(2) For "Aspen" aircraft—Call Oakland Center on FTS telephone 449-6331 or 797-3200 or use AUTOVON.

(3) For either "Dutch" or "Aspen" aircraft—Call the Aerospace Defense Command Facility and coordinate any further actions with them.

b. *EN ROUTE:* Comply with all requests from these pilots, the Aerospace Defense Command Facility, or the assistant chief of the Los Angeles or Oakland Centers.

c. *EN ROUTE:* Contact the assistant chief of the Los Angeles or Oakland Center, as appropriate, if there is any question regarding action to be taken.

d. *TERMINAL:* Forward the report verbatim to the associated center.

e. *TERMINAL:* Comply with all requests from the pilot or the center.

f. *TERMINAL:* Contact the center assistant chief if there is any question regarding action to be taken.

g. Do not discuss actions taken in regard to these aircraft with other than authorized personnel.

1642. LAW ENFORCEMENT ALERTS

a. Alerts shall not be distributed outside FAA except at non-FSS airports. At those locations, confine your search for information to airport offices and air carriers.

1642.a. Reference.—Order 1600.29B, Law Enforcement Alert Message System. 7210.3-256, Cooperation with Law Enforcement Agencies.

b. Upon receipt of knowledge concerning an aircraft for which a current law enforcement alert message is held, do the following:

(1) Forward any information on the aircraft to the originating FSS and the requester when specified in the message.

(2) Immediately notify the cognizant Air Transportation Security Division/Staff by the most rapid means.

(3) **DO NOT TAKE ANY OTHER ACTION AFFECTING THE AIRCRAFT, CARGO, CREW, OR PASSENGERS NOT NORMALLY RELATED TO JOB RESPONSIBILITIES.**

1643. EXPLOSIVE CARGO

TERMINAL

When you receive information that an emergency landing will be made with explosive cargo aboard, inform the pilot of the safest or least congested airport areas. Relay the explosive cargo information to:

a. The emergency equipment crew.

b. The airport management.

c. The appropriate military agencies when requested by the pilot.

1644-1659. RESERVED

Section 6. GROUND MISSILE EMERGENCIES

1660. INFORMATION RELAY

When you receive information concerning a ground missile emergency, notify other concerned facilities and take action to have alerting advisories issued by:

a. *EN ROUTE:* Air carrier company radio stations for each VFR company aircraft which is or will be operating in the vicinity of the emergency.

b. *EN ROUTE:* FSSs adjacent to the emergency location.

c. *TERMINAL:* Relay all information concerning a ground missile emergency to the center within whose area the emergency exists and disseminate as an NOTAM.

1660.c. Reference.—Glossary (Notice to Airmen).

1661. IFR AND SPECIAL VFR MINIMA

Reroute IFR and special VFR aircraft as necessary to avoid the emergency location by one of the following minima or by greater minima when suggested by the notifying official:

a. Lateral separation—*1 mile* between the emergency location and either of the following:

(1) An aircraft under radar control and the emergency location which can be accurately determined by reference to the radar scope.

(2) The airspace to be protected for the route being flown.

b. Vertical separation—*6,000 feet* above the surface over the emergency location.

1662. VFR MINIMA

Advise all known VFR aircraft which are, or will be, operating in the vicinity of a ground missile emergency to avoid the emergency location by *1 mile* laterally or *6,000 feet* vertically, or by a greater distance or altitude when suggested by the notifying official.

1663. SMOKE COLUMN AVOIDANCE

Advise all aircraft to avoid any observed smoke colums in the vicinity of a ground missile emergency.

1664. EXTENDED NOTIFICATION

EN ROUTE

When reports indicate that an emergency will exist for an extended period of time, a Notice to Airmen may be issued.

1665-1699. RESERVED

Item 431-D-1 not sent TD 4.308:Ai 7/3/980/ch.4/err.

ERRATA SHEET

9340

SUBJ: CHANGE 4 TO FAA ORDER 7110.65B, AIR TRAFFIC CONTROL

1. PURPOSE. This errata sheet corrects Change 4 to FAA Order 7110.65B, effective 1/1/81.

2. ACTION. Take the indicated action on the following pages:

a. Page 98 -- Change the identification number and date on the page 98 that contains the paragraph 652.b.(4) "TERMINAL: An arriving aircraft, receiving radar services, is advised to contact the tower," from 7110.65B, 1/1/80 to 7110.65B CHG 4, 1/1/81.

b. Page 107 -- Change the word "in" to "is" in line 3 of paragraph 723.b.

c. Page 162-1 -- Retain the page marked "Pages 162-1 and 162-2," dated 7/1/80.

d. Pages 98, 104, 124, and 162 — Insert arrows in the margin next to paragraphs 652, 703, 905, and 1220.

e. Appendix 3, page 3 -- Change the aircraft Weight Class/Group for the Lockheed Constellation, L749/C121, from "H" to "L".

f. Page Control Chart -- Change the date for page 113 on the Page Control Chart from "7/1/80" to "7/1/79."

Distribution: ZAT-710 (ALL)

Initiated by: AAT-210

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Item 431-D-1 TD 4.308:Ai 7/3/980/Ch.5/guide
pr

7110.65B CHG 5
4/1/81

contain

AIR TRAFFIC CONTROL HANDBOOK H.A.
9340

BRIEFING GUIDE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Distribution: A-WX(AT)-3; A-FAT-0 (MAX);
AAC-930 (5 cys); ACC-23 (1 cy);
Military

Initiated By: AAT-210

HANDBOOK : 7110.65B
CHANGE : 5
EFFECTIVE: 4/1/81

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH TITLE AND NUMBER:

Aircraft Identification, Paragraph 87(a)

2. BACKGROUND:

To reduce verbiage paragraph 87(a) was changed in 1977 to restrict the use of the prefix "November" to those situations where the aircraft type, model, or manufacturer's name is not known. Apparently the change is being misunderstood and some controllers hesitate to use the word "November" even though it is in the aircraft registration and the aircraft type, model, and manufacturer's name are not known.

3. CHANGE:

OLD

87. AIRCRAFT IDENTIFICATION

Identify aircraft as follows: Use the full identification in reply to aircraft with similar sounding identifications. For other aircraft, the same identification may be used in reply that the pilot used in his initial call-up except use the correct identification after communications have been established.

a. Civil—State the aircraft type, model or manufacturer's name, or if none of these are known, the digits/letters of the registration number.

87.a. Examples.—

"Jet Commander One Four Two Four."
"Douglas Three Zero Five Romeo."
"Bonanza One Two Three Four Tango."
"One Zero Xray Yankee."

NEW

87. Aircraft Identification.

Identify aircraft as follows: Use the full identification in reply to aircraft with similar sounding identifications. For other aircraft, the same identification may be used in reply that the pilot used in his initial call-up except use the correct identification after communications have been established.

a. Civil-State the aircraft type, model, or manufacturer's name, or if none of these are known, the letters/numbers of the aircraft registration.

87.a. Examples.-

"Jet Commander One Four Two Four."
"Douglas Three Zero Five Romeo."
"Bonanza One Two Three Four Tango."
"November One Two Three Four Golf."

87.a.Note- The prefix "November" denotes a U.S. civil aircraft registry and should be used only if the aircraft type, model, or manufacturer's name is not known.

4. OPERATIONAL CHANGE:

Clarifies the use of the prefix "November" when the model, type, or manufacturer's name is not known. (AAT-320).

HANDBOOK: 7110.65B
CHANGE: 5
EFFECTIVE: 4/1/81

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE:

88d, Description of Aircraft Types

2. BACKGROUND:

Paragraph 88d requires the issuance of traffic information to aircraft cleared for a visual approach if the traffic is a heavy aircraft. Actually, however, issuance of heavy aircraft traffic information is required in relation to a number of other operations, (reference section 4, paragraph 1435).

3. CHANGE:

OLD	NEW
* * * * *	* * * * *
d. When issuing traffic information to aircraft cleared for a visual approach, specify the word "heavy" when you know the traffic is a heavy aircraft.	d. When issuing traffic information to aircraft following a heavy jet, specify the word heavy and the aircraft type. 88d. Example - "Heavy Lockheed Ten-Eleven."

4. OPERATIONAL CHANGE:

This change makes paragraph 88d consistent with the procedures in section 4. (AAT-320)

Handbook: 7110.65B
Change #5
Effective: April 1, 1981

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE

282. Minima on Diverging Radials

2. BACKGROUND:

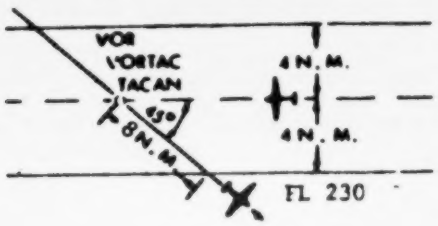
Prior to October 1, paragraph 282 specified the geographic distance required to provide separation between aircraft on diverging radials. Input from the field indicated that the table specifying geographic distances did not compensate for DME slant range error. Therefore, on October 1 (Change #3) the old table was deleted and a new table compensating for DME slant range error was substituted. Subsequently, some reports from field facilities indicated that the new minima adversely impacted some nonradar approach control facilities. To solve the problem, we disseminated Notice N7110.633 which revised paragraph 282 by reinstating the old geographic distance table and changing the DME table to provide for more flexibility. A subsequent examination of the DME table in the Notice raised some questions concerning the adequacy of the slant range values. Additionally, we determined that when the calculated slant range values at 10,000 feet and FL180 were rounded off to the next higher mile (to insure adequate airspace protection) they were exactly the same. Therefore, we decided to use FL180 as the most logical stratification altitude. The decision to return to two strata was made in an attempt to simplify the procedure. While this imposes some mileage penalty on aircraft at the lower altitudes in the FL180-450 stratum, we believe it to be an operationally acceptable compromise. One more point of information, the 11 mile figures in the FL180-450 table were revised downward from the 13 miles indicated in the Notice when we determined that 11 miles was adequate to prevent intrusion into the cone of ambiquity/silence. Controllers shall insure compliance with the minima in the DME table whenever they issue clearances specifying mileages, to pilots of DME equipped aircraft operating more than 3,000 feet above the elevation of the Navaid.

3. CHANGE:

OLD

▶282. MINIMA ON DIVERGING RADIALS

a. Consider separation to exist between aircraft established on radials of the same NAVAID that diverge by at least 15 degrees when either aircraft is clear of the airspace to be protected for the other aircraft.

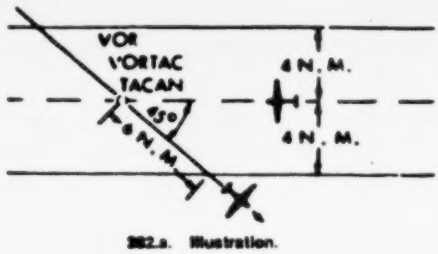


282.a. Illustration

NEW

282. MINIMA ON DIVERGING RADIALS

a. Consider separation to exist between aircraft established on radials of the same NAVAID that diverge by at least 15 degrees when either aircraft is clear of the airspace to be protected for the other aircraft.



282.a. Illustration

282.a. Note.—The procedure may be applied to converging as well as diverging aircraft. For example, the aircraft depicted 8 miles from the NAVAID at FL 280 in Illustration **282.a** would require vertical separation until reaching the 8 mile point. Reversing direction, the same aircraft would require vertical separation before passing the 8 mile point.

b. Use the **Table** to determine the flight distance required for various divergence angles and altitudes to clear the airspace to be protected.

282.b. Table —Divergence Distance Minima

Divergence (degrees)	*Distance (NM)*	
	FL 280 and below	*FL 290 through FL 450*
15-25	17	18
26-35	11	13
36-90	8	13

282b.—Note.—This table compensates for DME/slant range error.

282.a. Note.—The procedure may be applied to converging as well as diverging aircraft. For example, the aircraft depicted 6 miles from the NAVAID in Illustration **282.a.** would require vertical separation until reaching the 6 mile point. Reversing direction, the same aircraft would require vertical separation before passing the 6 mile point.

b. Use the Tables to determine the . distance required for various divergence angles to clear the airspace to be protected. For divergence that falls between two values, use the lesser divergence value to obtain the distance.

282.b.(1) Table-Non-DME Divergence-Distance Minima

Divergence(degrees)	Distance(NM)
15	16
20	12
25	10
30	8
35	7
45	6
55	5
90	4

282.b.(1) - Note. - This table is for NON-DME application only.

282.b.(2) Table- Divergence-Distance Minima

Divergence (degrees)	Distance(NM)	
	Below FL180	FL180-FL450
15	17	18
20	13	15
25	11	13
30	9	11
35	8	11
45	7	11
55	6	11
90	5	11

282.b.(2)-Note 1.-This table is for DME application and compensates for DME Slant Range error.

282.b.(2) - Note 2. - For altitudes 3,000 feet or less above the elevation of the Navaid, DME Slant Range error is negligible and the values in the 282.b.(1) Table may be used.

OPERATIONAL CHANGE:

Incorporates the intent of Notice N7110.633 into 7110.65B by reinstating the old geographic distance table (prior to change #3) and correcting and simplifying the DME table contained in the Notice.

Handbook 7110.65B
Change: #5
Effective: April 1, 1981

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE

351d and 351e, ABBREVIATED DEPARTURE CLEARANCE

2. BACKGROUND

ATP 7110.65B, paragraph 190 lists the order of clearance items and requires a SID to precede the route of flight portion. The language of paragraph 351d and 351e has been updated to reflect the requirement of paragraph 190.

3. CHANGE:

OLD	NEW
351. ABBREVIATED DEPARTURE CLEARANCE	351. ABBREVIATED DEPARTURE CLEARANCE
* * * * *	* * * * *
d. When no changes are required in the filed route, state the phrase "CLEARED TO (destination) AIRPORT AS FILED". Assign a SID and SID Transition as appropriate. Specify the en route altitude and, if required, add any additional instructions or information.	d. When no changes are required in filed route, state the phrase "CLEARED TO (destination) AIRPORT (SID and SID Transition as appropriate) THEN AS FILED." If SID is not assigned, follow with, "AS FILED." Specify the en route altitude and, if required, add any additional instructions or information.
Phraseology: CLEARED TO (destination) AIRPORT AS FILED, *and, as appropriate,* (SID name and number) DEPARTURE, (transition name) TRANSITION, MAINTAIN (altitude); *and, if required,* (additional instructions or information).	Phraseology: CLEARED TO (destination) AIRPORT, and as appropriate, (SID name and number) DEPARTURE, (Transition name) TRANSITION, THEN AS FILED; MAINTAIN (altitude), and if required, (additional instructions or information). If a SID is not assigned, state CLEARED TO (destination) AIRPORT AS FILED, MAINTAIN (altitude), and if required, (additional instructions or information).
351.d. Example.— "Cleared to Reynolds Airport as filed, David Two RNAV Departure, Kingham Transition, maintain niner thousand. Expect flight level four one zero 10 minutes after departure."	351d Example - 1 "Cleared to Reynolds Airport, David Two RNAV Departure, Kingham Transition, then as filed, maintain niner thousand. Expect flight level four one zero 10 minutes after departure."

OLD

NEW

351d Example - 2

"Cleared to Reynolds Airport as filed, maintain niner thousand. Expect flight level four one zero 10 minutes after departure."

351.d. Note 1.—SIDs are excluded from "cleared as filed" procedures.

351d NOTE 1 - No Change

351.d. Note 2.—If a pilot does not wish to accept an ATC clearance to fly a SID, he is expected to advise ATC or state "No SID" in his flight plan remarks.

351d NOTE 2 - No Change

e. When a filed route will require minor revisions, state the phrase "CLEARED TO (destination) AIRPORT AS FILED, EXCEPT", specify the necessary revision and assign a SID and SID Transition as appropriate. Specify the en route altitude and if required, add any additional instructions or information.

e. When a filed route will require minor revisions, state the phrase "CLEARED TO (destination) AIRPORT (SID and SID Transition as appropriate), THEN AS FILED, EXCEPT," specify the necessary revision, then the en route altitude and if required, add any additional instructions or information. If a SID is not assigned, state "CLEARED TO (destination) AIRPORT AS FILED, EXCEPT," specify the necessary revision, the en route altitude and if required, add any additional instructions or information.

Phraseology:

CLEARED TO (destination) AIRPORT AS FILED, EXCEPT CHANGE ROUTE TO READ (amended route portion) (SID name and number), MAINTAIN (altitude); *and, if required,* (additional instructions or information).

Phraseology:

CLEARED TO (destination) AIRPORT, and, as appropriate, (SID name and number) DEPARTURE (Transition name) TRANSITION, THEN AS FILED, EXCEPT CHANGE ROUTE TO READ, (amended route portion), MAINTAIN (altitude); and if required, (additional instructions or information). If SID is not assigned, state CLEARED TO (destination) AIRPORT AS FILED, EXCEPT CHANGE ROUTE TO READ, (amended route portion) MAINTAIN (altitude); and if required, (additional instructions or information).

351.e. Example.—

"Cleared to Reynolds Airport as filed, except change route to read South Boston V20 Greensboro, South Boston One Departure, maintain eight thousand, report leaving four thousand."

351e Example - 1

"Cleared to Reynolds Airport, South Boston One Departure, then as filed, except change route to read South Boston V20 Greensboro, maintain eight thousand, report leaving four thousand."

OLD	NEW
	351e Example - 2 "Cleared to Reynolds Airport, as filed, except change route to read, South Boston V20 Greensboro, maintain eight thousand, report leaving four thousand."

4. OPERATIONAL CHANGE:

Paragraphs 351d and 351e updated to make the placement of SIDs in an abbreviated departure clearance compatible with paragraph 190 and to further emphasize that SIDs are excluded from "cleared as filed" procedures. (AAT-330)

HANDBOOK: 7110.65B

Change 5
Effective 4/1/81

HANDBOOK CHANGE BRIEFING SHEET
(Editorial)

PARAGRAPH NUMBER AND TITLE	CHANGE	EFFECT
470(d) SPECIAL VFR AUTHORIZATION	Add "departure" after "landing" in middle of paragraph.	Changes paragraph to read, ". . .the airport of intended landing/ departure. . .," consistent with the intent of FAR 91.107(d)(2).

Handbook 7110.65B
Change #5
Effective: 4/1/81

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE:

604.b, Code Monitor
625.b(3), Function Code Assignments

2. BACKGROUND:

An Employee Suggestion has recommended that military aircraft on a VR route be assigned a special use beacon code, such as 4000. The rationale behind this suggestion is the air traffic controller may not be aware of the exact position of an aircraft on a VR route, thereby, timely traffic information may be jeopardized. If an aircraft flying a VR route were assigned a special use beacon code, the air traffic controller could monitor that code and provide more accurate information to other aircraft that operate in the vicinity of a particular VR route, thereby enhancing safety.

3. CHANGE:

OLD	NEW
604. CODE MONITOR	604. CODE MONITOR
* * * *	* * * *
604.b.	604.b.
b. Positions of operation which contain a restricted or warning area within or immediately adjacent to their area of jurisdiction shall monitor Code 4000 and any other code used in lieu of 4000 within the warning/restricted area. If by local coordination with the restricted/warning area user a code other than 4000 is to be exclusively used, then this code shall be monitored.	b. Positions of operation which contain a restricted or warning area or VR route within or immediately adjacent to their area of jurisdiction shall monitor Code 4000 and any other code used in lieu of 4000 within the warning/restricted area or VR route. If by local coordination with the restricted/warning area or VR route user a code other than 4000 is to be exclusively used, then this code shall be monitored.
625. FUNCTION CODE ASSIGNMENTS	625. FUNCTION CODE ASSIGNMENTS
* * * *	* * * *
625.b.(3) Note 2.—Military aircraft operating VFR or IFR in restricted/warning areas will adjust their transponders to reply on code 4000 unless another code has been assigned by ATC or coordinated, if possible, with ATC.	625.b(3) Note 2. - Military aircraft operating VFR or IFR in restricted/warning areas or VFR on VR routes will adjust their transponders to reply on Code 4000 unless another code has been assigned by ATC or coordinated, if possible, with ATC.

4. OPERATIONAL CHANGE:

This change achieves the objective of providing increased safety by requiring military aircraft operating on VR routes to set their transponder on Code 4000 unless otherwise assigned/approved by ATC.

HANDBOOK : 7110.65B
CHANGE : 5
EFFECTIVE: 4/1/81

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE:

656 ARTS IDENTIFICATION METHODS, and 703 RESPONSIBILITIES

2. BACKGROUND:

Handbook 7110.65B, paragraphs 656a(2), 703a(2)(g) and 703a(2)(g)(i) do not list all messages that may be displayed in an ARTS II full data block. This displayed data will require certain controller actions, especially since many ARTS II facilities have or will soon have interface capability.

3. CHANGE:

OLD

656. ARTS IDENTIFICATION METHODS

TERMINAL

a. Consider an auto-acquired aircraft as identified when its data block is displayed and is visible to you, not in coast, and one of the following conditions exist:

(1) Radar or beacon identification procedures have been used to confirm the identity of the tagged target.

(2) The aircraft is being handed off through use of NAS Stage A/ARTS or ARTS/ARTS automated handoff and "AMB," or "NAT," or "CST" does not appear in field 2 of the data block.

b. Use the ARTS data block to maintain target identity unless it is in a coast status or displaced from the appropriate target.

c. Displaced data block shall be updated at all times.

NEW

656. ARTS IDENTIFICATION METHODS

TERMINAL

a. no change

(1) no change

(2) The aircraft is being handed off through use of NAS Stage A/ARTS or ARTS/ARTS automated handoff and AM, AMB, TU, NAT, NB or CST does not appear in the data block.

b. no change.

c. no change.

703. RESPONSIBILITIES

a.(2)(g) Initiate verbal coordination prior to accepting control of a track when CST, NAT, AMB, NONE, OLD, NB, or TU is displayed in the data block.

(i) When an automated interfacility handoff action is initiated and "AMB" is displayed in the full data block, advise the other facility that a disparity exists between the position declared by their computer and that declared by your ARTS.

(ii) When an automated interfacility handoff action is initiated and "NAT" or "TU" is displayed in the full data block, advise the other facility if a disparity exists between the position declared by their computer and the actual target position.

703. RESPONSIBILITIES

a.(2)(g) Initiate verbal coordination prior to accepting control of a track when CST, NAT, AMB, NONE, OLD, NB, TU, AM, or OL is displayed in the data block.

(i) When an automated interfacility handoff action is initiated and AMB or AM is displayed in the full data block, advise the other facility that a disparity exists between the position declared by their computer and that declared by your ARTS.

(ii) No change.

4. OPERATIONAL CHANGE:

Updates the ARTS identification methods and transfer responsibilities to include the alert messages as received in the ARTS II system. (AAT-320).

HANDBOOK: 7110.65B
CHANGE: 5
EFFECTIVE: April 1, 1981

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE:

796, Visual Approaches

2. BACKGROUND:

Subparagraph 796.c. requires that an aircraft cleared for a visual approach must be able to proceed to the airport in VFR conditions. The term "VFR conditions" has been the source of long and heated debate. This change is intended to clarify the agency position on the weather criteria associated with a visual approach.

The basic question concerns the situation where the airport weather is reported as IFR but the pilot states that the aircraft is and can proceed to the airport in compliance with the VFR weather conditions prescribed in FAR 91.105. The position of the Air Traffic Service is that operational decisions must be based upon the most reliable information available.

The official weather for a particular airport is developed and prepared by people trained in weather science using sophisticated equipment and precise geographical reference points. The result is information as accurate as the state-of-the-art will allow. Pilot airborne observations, on the other hand, are "eyeball" estimates in an operating environment which, by its very nature, makes precision weather observations virtually impossible. Therefore, if the airport weather is reported as IFR but the pilot says that he/she can proceed to the airport in VFR conditions, we must base our operational decisions on the strongest and most defensible source of information; i.e., the official weather. If there is no official weather, then the pilot observation is the best information available and can be used in the operational decision making process.

While it may be possible for there to be a weather condition such that the aircraft can, in fact, proceed to the airport in VFR conditions even though the weather is reported as IFR, that condition would usually be transitory and no assurance can be given that the condition will continue until the aircraft reaches the runway. In addition, any attempt to define the operational/ weather situations under which an aircraft could be safely cleared for a visual approach with reported IFR conditions would be detailed, lengthy, and confusing. This background statement is intended to clarify and explain the agency position on this subject.

3. CHANGE:

OLD	NEW
796. VISUAL APPROACHES	796. VISUAL APPROACHES
* * * * * *	* * * * * *
c. Clearance for visual approach.	c. Clearance for a visual approach.
A radar controlled aircraft may be cleared for a visual approach provided: traffic conflicts with other aircraft have been resolved; the aircraft is and can remain in VFR conditions; and at a controlled airport, the tower is informed of the aircraft's position prior to communications transfer, and	A radar controlled aircraft may be cleared for a visual approach provided: traffic conflicts with other aircraft have been resolved; weather conditions at the airport are reported VFR or, at airports with no weather reporting service, the pilot reports that descent and flight to the airport can be made in VFR conditions; and, at a controlled airport, the tower is informed of the aircraft's position prior to communications transfer; and
* * * * * *	* * * * * *

4. OPERATIONAL CHANGE:

None. This change clarifies the required weather conditions associated with visual approaches. (AAT-320)

HANDBOOK: 7110.65B
CHANGE: 5
EFFECTIVE: 4/1/81

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE

821 Methods, 822 Minima, and 823 Limitations

2. BACKGROUND:

Handbook 7110.65B-822.d. restricts controllers to using 230 knots IAS as the minimum assignable airspeed for departing turbine and reciprocating engine aircraft. This is an unrealistic departure speed minima for most reciprocating engine aircraft and paragraph 822 has been revised accordingly.

Paragraphs 821 and 823, concerning options available to a controller when applying speed restrictions to reciprocating engine aircraft, have been clarified to facilitate use of the procedure. The material in paragraphs 821 and 823 have been standardized with that contained in FAR 91.70 and AIM - 272.

3. CHANGE:

OLD

821. METHODS

a. Request aircraft to:
(1) Maintain present speed.
(2) Increase or reduce to a specified speed or by a specified number.
(3) Avoid exceeding a specified speed.

Phraseology:
INCREASE/REDUCE SPEED:
TO(specified speed)
or
(number of knots) KNOTS
or
(number of knots)KNOTS.

(4) Only if the pilot concurs, reduce to a specified speed or amount less than the minimum speeds in 822.

Phraseology:
IF FEASIBLE, REDUCE SPEED:
TO(specified speed)
or
(number of knots)KNOTS.

NEW

821. METHODS
a. (1) through (3) same
a. (4) Phraseology:

IF PRACTICAL, REDUCE SPEED:
(no change).

OLD

822. MINIMA

Unless a pilot concurs in the use of a lower speed, use the following minima:

a. To aircraft operating between FL 280 and 10,000 feet, a speed not less than 250 knots.

b. To turbojet aircraft operating below 10,000 feet:

(1) A speed not less than 210 knots, except:

(2) Within 20 miles of the airport of intended landing, a speed not less than 170 knots.

c. Propeller aircraft within 20 miles of intended landing, a speed not less than 150 knots.

d. Departures, a speed not less than 230 knots.

NEW

822. MINIMA

Unless a pilot concurs in the use of a lower speed, use the following minima:

a. same (no change)

b. To arrival aircraft operating below 10,000 feet.

(1) Turbine powered aircraft, a speed not less than 210 knots, except when within 20 flying miles of the runway threshold of the airport of intended landing, a speed not less than 170 knots.

(2) Reciprocating engine aircraft, a speed not less than 150 knots when the aircraft is within 20 flying miles of the runway threshold of the airport of intended landing.

c. Departures:

(1) Turbine powered aircraft, a speed not less than 230 knots.

(2) Reciprocating engine aircraft, a speed not less than 150 knots.

823. LIMITATIONS

Accomplish speed adjustment to aircraft which cannot attain the speeds in 822. by requiring adjustment, if feasible.

Phraseology:
IF FEASIBLE, MAINTAIN (specific speed)
or
IF FEASIBLE, INCREASE/REDUCE SPEED (specified knots) KNOTS.

823. LIMITATIONS

Accomplish speed adjustments to aircraft which cannot attain the minimum speeds set forth in 822 by requesting such flights to, if practicable:

a. Maintain a specified speed equivalent to that of the preceding or succeeding aircraft; or

b. Increase or decrease speed utilizing increments of 10 knots or multiples thereof.

Phraseology:
If practical, maintain (specific speed) or
If practical, Increase/Reduce Speed (specified knots) KNOTS.

4. OPERATIONAL CHANGE:

Revises minimum assignable speed for departing reciprocating engine aircraft. Clarifies options available to a controller when applying speed restrictions to reciprocating engine aircraft. Editorial changes made to make material, including phraseology, consistent with information in the Airman's Information Manual.

HANDBOOK: 7110.65B

Change 5
Effective 4/1/81

HANDBOOK CHANGE BRIEFING SHEET
(Editorial)

	PARAGRAPH NUMBER AND TITLE	CHANGE	EFFECT
1.	980. DEPARTURE INFORMATION	Annotate subparagraph 980.g. by adding: "USAF NOT APPLICABLE"	Adds HQ USAF requested exception, omitted when proposal 320-77-6 was adopted.

HANDBOOK : 7110.65B
CHANGE : 5
EFFECTIVE: 4/1/81

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE:

1250. Application

2. BACKGROUND:

The present procedure allows too little flexibility for sequencing those aircraft that may not desire Stage II service. Such an operation requires prior coordination with approach control. Coordination may not be necessary or feasible in every case.

3. CHANGE:

OLD

1250. SERVICE APPLICATION

In addition to Stage I, apply Stage II procedures at those locations where a program has been established for this purpose. If an aircraft desires the service but cannot communicate on the appropriate frequencies, provide the service to the extent possible using an available frequency. Aircraft which do not desire the service provided may be fitted into the landing sequence by the tower, after coordination with approach control. Such aircraft shall, to the extent possible, be given the same landing sequence they would have received had they been sequenced by radar vectors.

1250. Note.—The service is mandatory on the controller's part unless the pilot declares that he does not want to participate. Arriving aircraft are assumed to want Stage II service unless the pilot states "Negative Stage II," or makes a similar comment.

NEW

1250. Application

In addition to the basic radar services prescribed in 1240., apply Stage II procedures at those locations where a program has been established for this purpose. If an aircraft desires the service but cannot communicate on the appropriate frequencies, provide the service to the extent possible using an available frequency. Aircraft which do not desire Stage II service may be fitted into the landing sequence by the tower. Coordination of these aircraft shall be accomplished with the approach control unless a Facility Directive/Letter of Agreement prescribes otherwise. Nonparticipating aircraft shall, to the extent possible, be given the same landing sequence they would have received had they been sequenced by radar vectors.

1250. Note. - No change.

4. OPERATIONAL CHANGE:

Allows a facility to establish a Letter of Agreement or Facility Directive, as appropriate, to govern Stage II coordination procedures for nonparticipants. (AAT-320).

HANDBOOK: 7110.65B
CHANGE: 5
EFFECTIVE: 4/1/81

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE:

1280., Application

2. BACKGROUND:

The original intent of applying Stage III services was that these services would be applied in addition to the basic services and Stage II services. Change 4 unintentionally deleted mention of Stage II. This change will amend the paragraph accordingly.

3. CHANGE:

OLD	NEW
1280. APPLICATION	1280. APPLICATION
In addition to the basic services described in **1240.**, apply Stage III procedures within the designated Terminal Radar Service Area (TRSA) or Terminal Control Area (TCA).	In addition to the basic services described in 1240 and the Stage II services, apply Stage III procedures within the designated Terminal Radar Service Area (TRSA) or Terminal Control Area (TCA).

4. OPERATIONAL CHANGE:

This change ensures that when applying Stage III services these services are applied in addition to the basic services and Stage II services, as originally intended. (AAT-320)

HANDBOOK : 7110.65B
CHANGE : 5
EFFECTIVE: 4/1/81

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE:

1286 TRSA Departure Information

1287 TCA Methods

2. BACKGROUND:

Advising VFR aircraft when leaving the TCA/TRSA will benefit both the controller and pilot. Many facilities already do this. This change will standardize the application of this procedure.

3. CHANGE:

OLD

1286. TRSA DEPARTURE INFORMATION

a. At controlled airports within the TRSA, inform a departing aircraft proposing to operate within the TRSA when to contact departure control and the frequency to use. If the aircraft is properly equipped, ground control or clearance delivery shall issue the appropriate beacon code.

1286.a. Note.—Departing aircraft are assumed to want Stage III service unless the pilot states, "Negative Stage III," or makes a similar comment. Pilots are expected to inform the controller of intended destination and/or route of flight and altitude.

b. Provide separation until the aircraft leaves the TRSA.

c. Aircraft departing satellite controlled airports that will penetrate the TRSA should be provided the same service as those aircraft departing the primary airport. Procedures for handling this situation shall be covered in a Letter of Agreement or Facility Directives, as appropriate.

d. Procedures for handling aircraft departing uncontrolled satellite airports must be advertised in a facility bulletin and service provided accordingly.

NEW

1286. TRSA Departure Information

a. No change

1286.a.Note. No change

b. No change

c. Inform VFR participating aircraft when leaving the TRSA.

Phraseology:

Leaving the (name) TRSA, (and as appropriate) resume own navigation, standby for traffic advisories, radar service terminated, squawk one two zero zero, etc.

d. (old c.)

e. (old d.)

OLD

1287. TCA METHODS

a. To the extent practical, clear large turbine-powered aircraft to/from the primary airport using altitudes and routes that avoid VFR corridors and airspace below the TCA floor where VFR aircraft are operating.

1287.a. Note.—Pilots operating in accordance with VFR are expected to advise ATC if compliance with assigned altitudes, headings, or routes will cause any violation of FARs.

b. Workload and traffic conditions permitting, approve/deny requests from VFR aircraft to operate in TCAs.

1287.b. Examples.—

"Approved as requested, (additional instructions, as necessary)."

"Unable to approve clearance through TCA, (wher necessary reason and/or additional instructions)."

"Cleared to Los Angeles airport, enter TCA at three thousand five hundred, vicinity of Queen Mary."

"Cleared to enter TCA via direct Oakland VOR, maintain four thousand five hundred while in TCA."

"Climb through TCA approved, report leaving seven thousand."

c. Vector aircraft to contain them in the TCA once they have entered it. If it is necessary to extend an aircraft's flight path outside the TCA for spacing, inform the aircraft when it leaves and reenters the TCA.

1287.c. Note.—FAR 91.90 requires large, turbine-powered aircraft operating to or from the primary airport to operate at or above the designated floor of the TCA while within the lateral limits, unless otherwise authorized by ATC. Such authorization should be the exception rather than the rule.

1288-1299. RESERVED

NEW

1287. TCA Methods

a. No change

1287.a.Note. No change

b. No change

1287.b.Examples. No change

c. Inform VFR aircraft when leaving the TCA.

Phraseology:

Leaving the (name) TCA, (and as appropriate) resume own navigation, standby for traffic advisories, radar service terminated, squawk one two zero zero etc.

d. (old c.)

1287.d.Note (Old 1287.c.Note)

1288 - 1299. Reserved.

4. OPERATIONAL CHANGE:

This change initiates a standard procedure for controllers to inform VFR pilots when leaving TCAs/TRSAs, and includes appropriate phraseology. (AAT-320).

HANDBOOK : 7110.65B
CHANGE : 5
EFFECTIVE: April 1, 1981

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBER AND TITLE:

1405.c, Takeoff Operations

2. BACKGROUND:

Although this paragraph provides for the use of radar separation in lieu of the 2-minute rule, there are times when a pilot will desire the full 2 minutes depending on the types of aircraft involved and the conditions at the time.

However, recent indications are that some pilots make this request after taxiing on the runway which can create problems for arrival aircraft if the departure remains on the runway longer than expected. Because of this, a change was made to the Airman's Information Manual (AIM) to inform the pilot that additional wake turbulence separation may be requested, but such requests should be made prior to taxiing onto the runway.

This change complements that made to the AIM by providing the same information to controllers.

3. CHANGE:

OLD	NEW
1405. TAKEOFF OPERATIONS *TERMINAL* **a.** Do not issue clearances which imply or indicate approval of rolling takeoffs by heavy jet aircraft. **b.** Do not issue clearances to a Category I or Category II aircraft to taxi into position and hold on the same runway behind a departing heavy jet aircraft to apply the necessary intervals in **1404.**, **1420.a.**, or **1426.a.**(1). **1405.b. Reference.**—Aircraft Categories, 1110 Note. AC 90-23D, Wake Turbulence. **c.** The minima in **1420.a.** may be applied in lieu of the 2-*minute* requirement in **1426.a.** When the **1420.a.** minima are applied, ensure that the appropriate radar separation exists at or prior to the time an aircraft becomes airborne when taking off behind a heavy jet.	1405. Takeoff Operations. a. No change b. No change c. No change
None	1405.c. Note - The pilot may request additional separation (i.e. 2 minutes vs. 4 miles) but should make this request before taxiing on the runway.

4. Operational Change:

None. (AAT-320)

HANDBOOK: 7110.65B
CHANGE: 5
EFFECTIVE: April 1, 1981

HANDBOOK CHANGE BRIEFING SHEET

1. PARAGRAPH NUMBERS AND TITLE:

(a) 1480a.(1) and 1480a.(2)

2. BACKGROUND:

There has been considerable confusion in the past concerning the requirements to forward AMIS information to NORAD on nonscheduled versus scheduled Communist bloc aircraft. The present wording contained in the subject paragraphs implies that no requirement exists to forward data on scheduled civil aircraft movements of Communist-controlled countries. Also, confusion surfaced concerning the definition of the two categories, scheduled and unscheduled. While there are a number of flights that enter or overfly the various ADIZ areas on an individual precoordinated random basis, there are presently only 13 scheduled flights weekly into or out of New York and/or Dulles airports.

3. CHANGE:

OLD

1480. GENERAL EN ROUTE

a.(1) All known aircraft of Cuban registry and all known nonscheduled civil aircraft of other Communist-controlled countries that will enter or overfly the Continental United States, the Atlantic, Gulf of Mexico or Pacific Coastal ADIZs or the Southern Border Domestic ADIZ. If there is any question as to whether these aircraft or the aircraft in (2) below are scheduled or nonscheduled, treat the flight movement data as though it were for nonscheduled aircraft.

1480.a(1) Reference - Glossary (Continental United States)

(2) All known nonscheduled civil aircraft of foreign registry (other than the aircraft in (1) above) that will enter or overfly the Continental United States en route to or from Cuba.

NEW

1480. GENERAL EN ROUTE

a.(1) All known aircraft of Cuban registry and all known civil aircraft of other Communist-controlled countries that will enter, overfly or operate within the Continental United States, the Atlantic, Gulf of Mexico or Pacific Coastal ADIZs or the Southern Border Domestic ADIZ.

1480.a(1) Reference - Glossary (Continental United States)

(2) All known civil aircraft of foreign registry (other than the aircraft in (1) above) that will enter or overfly the Continental United States en route to or from Cuba.

4. OPERATIONAL CHANGE:

This change clarifies NORAD/ADC AMIS requirements pertaining to scheduled and nonscheduled aircraft of communist bloc countries that approach, enter or overfly U.S. and its adjacent water areas.

HANDBOOK: 7110.65B

Change 5
Effective 4/1/81

HANDBOOK CHANGE BRIEFING SHEET
(Editorial)

PARAGRAPH NUMBER AND TITLE	CHANGE	EFFECT
3. Appendix 6. Standard Operating Practice (SOP) for the transfer or position responsibility.	Add the following note to subparagraph 5.c: Note. - The "sharing" of this responsibility means that the specialist being relieved is obligated to provide a complete, accurate briefing and the relieving specialist is obligated to ensure that a briefing takes place and is to his/her total satisfaction.	Clarifies the intent of subparagraph 5.c.

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CHANGE

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

7110.65B CHG 6

4/10/81

CONTIN

9340

Cancellation Date: Retain

SUBJ: CHANGE TO THE AIR TRAFFIC CONTROL HANDBOOK

1. PURPOSE. This change transmits revised pages for the Air Traffic Control handbook, Order 7110.65B.

2. EXPLANATION OF CHANGES. The significant changes are highlighted below. If further information is desired, contact the office in parentheses.

a. 11. CONSTRAINTS GOVERNING SUPPLEMENTS AND PROCEDURAL DEVIATIONS. Clarifies the requirement for the approval of regional and military procedural deviations. (AAT-340)

b. 21. ABBREVIATIONS. Adds ATCT. (AAT-3)

c. 46. TRAFFIC ADVISORIES. Provides standardization of the phrase as it appears in the FARs and the AIM. (AAT-305)

d. 52. BIRD ACTIVITY INFORMATION. Requires tower controllers to issue advisory information on "tower observed" bird activity. (AAT-320)

e. 58. VFR ON TOP. Clarifies the procedural application of "VFR conditions" and "VFR on top." (AAT-330)

f. 85. NUMBERS USAGE; SPEEDS. Allows the optional use of mach numbers in speed adjustments between turbojet aircraft at the same altitude at or above FL 240. (AAT-330)

g. 87. AIRCRAFT IDENTIFICATION. Adds a reference and deletes an example. (AAT-320)

h. 182. POSITIVE CONTROL AREA RESTRICTIONS. See e.

i. 470. AUTHORIZATION (Special VFR). Alerts controllers to the FAR pilot requirements for nighttime fixed-wing Special VFR operations. (AAT-320)

j. 491. VFR CONDITIONS. See e.

k. 492. VFR ON TOP. See e.

l. 493. ALTITUDE FOR DIRECTION OF FLIGHT. See e.

m. 630. VFR OPERATIONS. See e.

Distribution: ZAT-710 (ALL)

Initiated By: AAT-210

n. 655. BEACON IDENTIFICATION METHODS. Clarifies the intent that an aircraft must be squawking the computer-assigned discrete code. (AAT-330)

o. 656. ARTS IDENTIFICATION METHODS. Deletes a phrase that should have been deleted in Change 5. (AAT-210)

p. 745. ADDITIONAL SEPARATION FOR FORMATION FLIGHTS. Provides additional separation for formation flights relative to standard radar separation, Stage III separation, adjacent airspace, edge of scope indicator, and prominent obstructions when ATC is vectoring around the prominent obstructions. (AAT-320)

q. 820. APPLICATION (Speed Adjustment). See f.

r. 821. METHODS (Speed Adjustment). See f.

s. 822. MINIMA (Speed Adjustment), Adds phrases that should have been included in Change 5. (AAT-210) Also, see f.

t. 973. RUNWAY PROXIMITY. Provides more specific guidance for holding taxiing aircraft clear of the runway. (AAT-320)

u. 1080. FURNISH RVR/RVV VALUES. Revises the note and reference. (AAT-320)

v. 1482. EMERGENCY OR UNSCHEDULED LANDINGS. Clarifies the reporting responsibilities of the Anchorage ARTCC. (AAT-340)

w. 1713. VISUAL SEPARATION AND VFR. See e.

x. Appendix 3. AIRCRAFT WEIGHT CLASSES AND GROUPS. Adds the military designators for the Beech Aircraft Super King Air and the DeHavilland Caribou. (AAT-320)

y. Appendix 4. PILOT/CONTROLLER GLOSSARY.

(1) Aerial Refueling/In-flight Refueling. Corrects the reference. (AAT-210)

(2) AIRMET/Airman's Meterological Information. Corrects the definition. (AAT-360)

(3) Airport Marking Aids. Adds a definition to make the language consistent with Advisory Circular 150/5340-1E. (AAT-320)

(4) Convective SIGMET/Convective Significant Meterological Information. Corrects the definition. (AAT-360)

(5) IFR Over the Top. Withdrawn. See e.

(6) Runway Markings. Refers the reader to Airport Marking Aids. (AAT-320)

(7) Speed Adjustment. Adds the optional use of mach numbers and corrects the examples. (AAT-330)

(8) Terminal Radar Program. Clarifies the intent. (AAT-320)

(9) VFR Conditions. See e.

(10) VFR Conditions on Top/VFR on Top. See e.

(11) VFR Over the Top. Withdrawn. See e.

3. EFFECTIVE DATE. This change is effective July 1, 1981.

4. PAGE CONTROL CHART. See the Attachment for the Page Control Chart.

R. J. VAN VUREN
Director, Air Traffic Service

PAGE CONTROL CHART

REMOVE PAGES	DATED	INSERT PAGES DATED 7/1/81
Foreward	Basic	Foreward
ii	4/1/80	ii
vi	10/1/80	vi
viii	7/1/80	viii
3	10/1/80	3
4	4/1/80	4
5	4/1/81	5
12	1/1/81	12
12-1	10/1/80	12-1
12-2	4/1/80	12-2
12-4	4/1/80	12-4
18	4/1/80	18
19	4/1/81	19
35	1/1/80	35
49	1/1/80	49
80	4/1/81	80
82	7/1/80	82
83	10/1/80	83
84	1/1/81	84
85 through 88	10/1/80	85 through 88
94	1/1/81	94
99	4/1/81	99
110 and 111	1/1/81	110 and 111
119 and 120	4/1/81	119 and 120
129	1/1/81	129
130	7/1/80	130
142	4/1/80	142
182	4/1/81	182
214	7/1/80	214
Appendix 3		Appendix 3
1	1/1/80	1
2	1/1/81	2
Appendix 4		Appendix 4
2 and 3	1/1/80	2 and 3
5 and 6	1/1/80	5 and 6
13	1/1/81	13
20	1/1/80	20
34	7/1/80	34
37	7/1/80	37
39	1/1/81	39
42	1/1/81	42
43	7/1/80	43

AIR TRAFFIC CONTROL
7110.65B
FOREWORD

1. PURPOSE

This handbook prescribes air traffic control procedures and phraseology for use by personnel providing air traffic control services. Controllers are required to be familiar with the provisions of this handbook which pertain to their operational responsibility and to exercise their best judgement if they encounter situations not covered by it.

2. DISTRIBUTION

This handbook is distributed to selected offices in the Washington Headquarters, the Region Headquarters, the Area Offices, the Technical Center, the Aeronautical Center, all the Air Traffic Facilities, all the International Aviation Field Offices, and the interested aviation public.

3. EFFECTIVE DATE.

This handbook is effective January 1, 1980.

4. CANCELLATIONS.

Order 7110.65A is canceled.

5. EXPLANATION OF MAJOR CHANGES.

See Attachment 1 for explanation of major changes.

R. J. Van Vuren
Director, Air Traffic Service

EXPLANATION OF MAJOR CHANGES

This issuance of Order 7110.65B supersedes prior editions of the Air Traffic Control Handbook and adds the information in the following paragraphs:

a. 33. SAFETY ADVISORY. Deletes the requirement to always issue the MDA as part of a terrain/obstruction safety advisory for aircraft inside the final approach fix and includes the term "Decision Height" (DH) as part of the phraseology. (AAT-320)

b. 41. SIGMET ALERT. Provides more latitude for facilities when disseminating SIGMET information and clarifies the intent of paragraph 41.c. (AAT-320)

c. 42. REPORTING WEATHER CONDITIONS. Provides guidance previously contained in the Federal Meteorological Handbook No. 1. (AAT-320)

d. 75. through 81. RADIO AND INTERPHONE COMMUNICATIONS. Provides a format to standardize interphone usage to enhance communications and reduce misunderstandings. (AAT-320)

e. 233.d ALTITUDE INFORMATION. Deletes the requirement to repeat the altitude in Example 4. (AAT-320)

f. 526. MERGING TARGET PROCEDURES. Amended to clearly show that the procedure described in subparagraph **b.** is applicable to those aircraft listed in subparagraph **a.** (AAT-320)

g. 700-703. TRANSFER OF RADAR IDENTIFICATION. Establishes a Standard Operating Practice (SOP) for the transfer of radar identification and associated coordination. (AAT-320)

h. 942. BRAKING ACTION. Amended to specify that the time the Mu-Meter report was taken be relayed to the pilot. (AAT-320)

i. 1113. INTERSECTION TAKEOFF SEPARATION. Permits intersection takeoffs for Category I and II aircraft behind a nonheavy Category III aircraft without the 3-minute wake turbulence separation requirement when departing from an intersection 500 feet or less from the runway threshold. (AAT-320)

j. 1284. ALTITUDE ASSIGNMENTS. Requires ATC to provide terrain protection comparable to that received by IFR aircraft to VFR aircraft receiving Stage III service when an altitude assignment or instruction containing an altitude is issued. (AAT-320)

k. APPENDIX 1. CONTROL ABBREVIATIONS AND SYMBOLS. Provides the necessary strip marking clearance abbreviation for "pilot's discretion." (AAT-330)

l. APPENDIX 4. PILOT/CONTROLLER GLOSSARY.

(1) Emergency Safe Altitude. Clarifies that the obstacle clearance in designated mountainous areas is 2,000 feet. (AAT-320)

(2) Flight Line. Incorporates a term into the Glossary to describe the intended line of flight of photogrammetric aircraft. (AAT-320)

(3) Handoff. Updates the definition. (AAT-320).

(4) Minimum Obstruction Clearance Altitude/MOCA. Changes the distance from 25 nautical to 25 statute miles so as to agree with FAR Parts 91.119 and 95.1 (AAT-305)

(5) Radar Contact. Updates the definition. (AAT-320)

(6) Stereo Route. Provides a definition of "stereo route." (AAT-320)

(7) Traffic. Introduces a new definition. (AAT-320)

(8) Visual Descent Point/VDP. Clarifies pilot requirements for descent from MDA upon reaching a VDP prescribed in a nonprecision instrument approach procedure. (AAT-320)

m. APPENDIX 5. STANDARD OPERATING PRACTICE (SOP) FOR TRANSFER OF RADAR IDENTIFICATION AND ASSOCIATED COORDINATION. See **700-703.**

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Section 2. APPLICATION OF AIR TRAFFIC CONTROL SERVICE

10. ATC SERVICE

Provide air traffic control service in accordance with the procedures and minima in this handbook except when:

a. Deviation is necessary to conform with ICAO Documents, National Rules of the Air, or special agreements where the United States provides air traffic control service in airspace outside the United States and its possessions.

10.a. Note.—Pilots are required to abide by FARs or other applicable regulations regardless of the application of any procedure or minima in this handbook.

b. Other procedures/minima are prescribed in a Letter of Agreement, an FAA or military document.

10.b. Note.—These procedures may include altitude reservations, air refueling, and fighter interceptor operations.

10.b. Reference.—Procedural Letters of Agreement, 12.

11. CONSTRAINTS GOVERNING SUPPLEMENTS AND PROCEDURAL DEVIATIONS

a. Exceptional or unusual requirements may dictate procedural deviations or supplementary procedures to this handbook. Prior to implementing supplemental or any procedural deviation that alters the level, quality, or degree of service obtain prior approval from the Director, Air Traffic Service.

→ **b.** If military operations or facilities are involved, prior approval by the following appropriate headquarters is required for subsequent interface with FAA:

U.S. Navy:	CNO (OP-513)
U.S. Air Force:	AFXOOTF
U.S. Army:	Director, USAATCA—Aeronautical Services Office (CCQ-ASO-AT), Cameron Station, Alexandria, Virginia 22314

11. Note.—*TERMINAL:* Headquarters USAF has delegated to major air commands authority to authorize base commanders to reduce same runway separation standards for military aircraft. These are specified and approved by affected ATC and user units. When applied, appropriate advisories may be required; e.g., "(Ident) continue straight ahead on right side; F-16 landing behind on left." "(Ident) hold position on right side; F-5 behind on left."

12. PROCEDURAL LETTERS OF AGREEMENT

Procedures/minima which are applied jointly or otherwise require the cooperation or concurrence of more than one facility/organization must be documented in a Letter of Agreement. Letters of Agreement only supplement this handbook. Any minima they specify must not be less than that specified herein unless appropriate military authority has authorized application of reduced separation between military aircraft.

12. Reference.—7210.3—430, Letters of Agreement.

13. USE OF MARSA

a. MARSA may only be applied to special military operations specified in a Letter of Agreement or other appropriate FAA or military document.

13.a. Note.—Application of MARSA is a military command prerogative. It will not be invoked indiscriminately by individual units or pilots. It will be used only for special IFR operations requiring its use. Commands authorizing MARSA will ensure that its implementation and terms of use are documented and coordinated with the control agency having jurisdiction over the area in which the operations are conducted. Terms of use will assign responsibility and provide for separation among participating aircraft.

b. ATC facilities do not invoke or deny MARSA. Their sole responsibility concerning the use of MARSA is to provide separation between military aircraft engaged in MARSA operations and other nonparticipating IFR aircraft.

14. MILITARY PROCEDURES

Military procedures in the form of additions, modifications, and exceptions to the basic FAA procedure are prescribed herein when a common procedure has not been attained or to fulfill a specific requirement. They shall be applied by:

a. ATC facilities operated by that service.

14.a. Examples.—

An Air Force facility providing service for an Air Force Base would apply USAF procedures to all traffic regardless of class.

A Navy facility providing service for a Naval Air Station would apply USN procedures to all traffic regardless of class.

b. ATC facilities, regardless of their parent organization (FAA, USAF, USN, USA), supporting a designated military airport exclusively. This designation determines which military procedures are to be applied.

14.b. Examples.—

An FAA facility supports a USAF Base exclusively—USAF procedures are applied to all traffic at that base.

An FAA facility provides approach control service for a Naval Air Station as well as supporting a civil airport—Basic FAA procedures are applied at both locations by the FAA facility.

A USAF facility supports a USAF Base and provides approach control service to a satellite civilian airport—USAF procedures are applied at both locations by the USAF facility.

14.b. Reference.—Annotations, 3.

c. Other ATC facilities when specified in a Letter of Agreement.

14.c. Example.—

A USAF Unit is using a civil airport supported by an FAA facility—USAF procedures will be applied as specified in a Letter of Agreement between the unit and the FAA facility to the aircraft of the USAF Unit. Basic FAA procedures will be applied to all other aircraft.

15-20. RESERVED

Section 3. ABBREVIATIONS

21. ABBREVIATIONS

As used in this manual, the following abbreviations have the meanings indicated.

Abbreviation	*Meaning*
AC	Assistant Chief
ACLS	Automatic Carrier Landing System
ACP	Area Command Post
ADC	Aerospace Defense Command
AIM	Airman's Information Manual
AIRMET	Airmen's meterological information
ALNOT	Alert notice
ALS	Approach light system
ALTRV	Altitude reservation
AMB	Ambiguity—A disparity greater than 2 miles exists between the position declared for a target by ARTS and another facility's computer declared position during interfacility handoff
ANG	Air National Guard
APREQ	Approval request
ARAC	Radar approach control facility (USA)
ARCP	Air refueling control point
ARINC	Aeronautical Radio Incorporated
ARIP	Air refueling initial point
ARSR	Air route surveillance radar
ARTCC	Air route traffic control center
ASDE	Airport surface detection equipment
ASR	Airport surveillance radar
ATC	Air traffic control
ATCAA	ATC Assigned Airspace
ATCCC	Air Traffic Control Command Center
ATCRBS	Air traffic control radar beacon system
→ ATCT	Airport Traffic Control Tower
ATIS	Automatic terminal information service
ATPAC	Air Traffic Procedures Advisory Committee
ATS	Air Traffic Service
CACT	Civil Air Carrier Turbojet
CARF	Central Altitude Reservation Function
CAT	Clear air turbulence
CELNAV	Celestial Navigation Training
CCC	Regional Communications Control Center
CERAP	Combined Center/RAPCON
CFCF	Central Flow Control Function
COPCOM	Controllers' Operations/Procedures Committee
DF	Direction finder
DH	Decision height
DMAAC	Defense Mapping Agency Aerospace Center
DMAHC	Defense Mapping Agency Hydrographic Center
DME	Distance measuring equipment compatible with TACAN
DOE	Department of Energy
EAC	Expect approach clearance
ECM	Electronic Counter Measure
EFAS	Enroute Flight Advisory Service
EFC	Expect further clearance
ELT	Emergency Locator Transmitter
EOVM	Emergency obstruction video map
ETA	Estimated time of arrival
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FDEP	Flight Data Entry and Printout
FIFO	Flight Inspection Field Office
FIR	Flight information region
FL	Flight level
FLIP	Flight Information Publication
FRC	Full route clearance necessary
FSDO	Flight Standards District Office
FSNFO	Flight Standards National Field Office
FSS	Flight service station
FTS	Federal Telecommunications System
FW/SIFR	Fixed-Wing Special Instrument Flight Rules
FW/SVFR	Fixed-Wing Special Visual Flight Rules
GCA	Ground controlled approach
HIRL	High intensity runway lights
ICAO	International Civil Aviation Organization
IDENT	Aircraft Identification
IFR	Instrument flight rules
IFSS	International flight service station
INF	Inland Navigation Facility
INREQ	Information request
IR	IFR Military Training Route
JATO	Jet assisted takeoff
L/MF	Low/medium frequency
LAWRS	Limited aviation wea. reporting station
LLWSAS	Low level wind shear alert system
MALS	Medium intensity approach light system
MALSR	Medium approach light system with runway alignment indicator lights
MAP	Missed approach point
MARSA	Military authority assumes responsibility for separation of aircraft
MCA	Minimum crossing altitude

Abbreviation	*Meaning*
MDA	Minimum descent altitude
MEA	Minimum enroute (IFR) altitude
MIRL	Medium intensity runway lights
MITO	Minimum interval takeoff
MOA	Military Operations Area
MOCA	Minimum obstruction clearance altitude
MSAW	Minimum Safe Altitude Warning
MRA	Minimum reception altitude
MSL	Mean sea level
MTI	Moving target indicator
MTR	Military Training Route
MVA	Minimum vectoring altitude
NAR	North American Route
NAS	National Airspace System
NAT	Not ARTS tracked (ARTS is not tracking the target and no ambiguity check can be made.)
NBCAP	National Beacon Code Allocation Plan
NDB	Non-Directional Radio Beacon
NOAA	National Oceanic and Atmospheric Administration
NORAD	North American Air Defense Command
NOS	National Ocean Survey
NWS	National Weather Service
NTZ	No Transgression Zone
→ ODALS	Omnidirectional approach lighting system
PAR	Precision approach radar
PDAR	Preferential Departure Arrival Route
PBCT	Proposed Boundary Crossing Time
PCA	Positive Control Area
PAR	Preferential Arrival Route (Stage A)
PDR	Preferential Departure Route
RAC	Department of Energy special flight
RAIL	Runway alignment indicator lights
RAPCON	Radar approach control facility (USAF)
RATCF	Radar air traffic control facility (USN)
RBS	Radar bomb scoring
RCC	Rescue Coordination Center
RCLS	Runway centerline system
RCR	Runway condition reading
REIL	Runway end identifier lights
RNAV	Area Navigation
RVR	Runway visual range
RVV	Runway visibility value
SAC	Strategic Air Command
SAFI	Semi-automatic flight inspection
SAR	Search and rescue
SFA	Single frequency approach
SFO	Simulated flameout
SID	Standard instrument departure
SIGMET	Significant meteorological information
STAR	Standard terminal arrival
STOL	Short takeoff and landing
SVFR	Special Visual Flight Rules
TACAN	TACAN-UHF navigational aid (omnidirectional course and distance information)
TCA	Terminal Control Area
TDZL	Touchdown zone light system
TRACAB	Terminal radar approach control in tower cab
TRACON	Terminal radar approach control
TRSA	Terminal Radar Service Area
UHF	Ultra high frequency
USA	United States Army
USAF	United States Air Force
USN	United States Navy
UTM	Unsatisfactory transmission message
VFR	Visual flight rules
VHF	Very high frequency
VOR	VHF navigational aid (omnidirectional course information)
VOR-DME	Collocated VOR and DME navigational aids (VHF course and UHF distance information)
VORTAC	Collocated VOR and TACAN navigation aids (VHF and UHF course and UHF distance information)
VR	VFR Military Training Route
WSFO	Weather Service Forecast Office
WSO	Weather Service Office

Section 2. WEATHER INFORMATION

40. FAMILIARIZATION

Become familiar with pertinent weather information when coming on duty and stay aware of current weather information needed to perform air traffic control duties.

41. SIGMET ALERT

a. Broadcast a SIGMET alert once on all frequencies, except emergency frequencies, when any part of the area described in the SIGMET is within 150 miles of the airspace under your jurisdiction. The broadcast is not required if aircraft on your frequency/s will not be affected by the weather addressed in the SIGMET.

b. Terminal facilites have the option to limit the SIGMET broadcast as follows. Local control, and approach control positions serving arrival aircraft, may opt to broadcast SIGMET alerts only when any part of the area described in the SIGMET is within 50 miles of the airspace under their jurisdiction.

c. Include the following information in SIGMET broadcast.

(1) The term "convective" when applicable.

(2) SIGMET number.

(3) General description of the area affected.

(4) Brief description of the type of weather.

41.c.(4) Note 1.—The message should be brief but contain enough information to alert pilots of significant weather conditions along their route of flight and to enable them to decide whether they should contact an FSS for more detailed SIGMET information.

41.c.(4) Note. 2.—FSSs within 150 miles of the SIGMET area broadcast SIGMETs once upon receipt and at 15 minute intervals (H+00, H+15, H+30, and H+45) during the first hour after issuance and thereafter broadcast a brief notice at H+15 and H+45 during the valid period of the SIGMET.

Phraseology:

ATTENTION ALL AIRCRAFT, SIGMET/CONVECTIVE SIGMET (number). (Brief description of area affected and type of weather.)

41. Examples.—

"Attention all aircraft, SIGMET Delta Three. From Myton to Tuba City to Milford. Severe turbulence and severe clear icing below one zero thousand feet. Expected to continue beyond zero three zero zero Greenwich."

"Attention to all aircraft, Convective SIGMET Two Seven Eastern. From the vicinity of Elmira to Phillipsburg. Scattered embedded thunderstorms moving east at one zero knots. A few intense level five cells, maximum tops four five zero."

42. REPORTING WEATHER CONDITIONS

a. *USA/USAF NOT APPLICABLE.* When the prevailing visibility at the usual point of observation, or at the tower level, is less than 4 miles, tower personnel shall take prevailing visibility observations and apply the observations as follows:

(1) Use the lower of the two observations (tower or surface) for aircraft operations.

(2) Forward tower visibility observations to the weather observer.

(3) Notify the weather observer when the tower observes the prevailing visibility to decrease to less than 4 miles or increase to 4 miles or more.

b. Forward current weather changes to the appropriate control facility as follows:

(1) When the official weather changes to a condition which is below 1,000-foot ceiling or below the highest circling minimum, whichever is greater, or less than 3 miles visibility, and when it improves to a condition which is better than those above.

USAF: Use 1,500 foot ceiling.

(2) Changes which are classified as special weather observations during the time that weather conditions are below 1,000-foot ceiling or the highest circling minimum, whichever is greater, or less than 3 miles visibility.

USAF: Use 1,500 foot ceiling.

c. Towers at airports where military turbojet en route descents are routinely conducted shall also report the conditions to the ARTCC even if it is not the controlling facility.

d. If the receiving facility informs you that weather reports are not required, discontinue the reports. The time period specified should not exceed the duration of your tour of duty.

e. *EN ROUTE:* When you determine that weather reports for an airport will not be required for a specific time period, inform the FSS or tower of this determination. The time period specified should not exceed the duration of your tour of duty.

43-44. RESERVED

Section 3. ADDITIONAL SERVICES

45. APPLICATION

Provide additional services to the extent possible, contingent only upon higher priority duties and other factors including limitations of radar, volume of traffic, frequency congestion, and workload.

45. Note.—The primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic. In addition to its primary function, the ATC system has the capability to provide (with certain limitations) additional services. The ability to provide additional services is limited by many factors such as the volume of traffic, frequency congestion, quality of radar, controller workload, higher priority duties, and the pure physical inability to scan and detect those situations that fall in this category. It is recognized that these services cannot be provided in cases in which the provision of services is precluded by the above factors. Consistent with the aforementioned conditions, controllers shall provide additional service procedures to the extent permitted by higher priority duties and other circumstances. The provision of additional services is not optional on the part of the controller, but rather is required, when the work situation permits.

45. Reference.—Duty Priority, 22.

46. TRAFFIC ADVISORIES

→ Unless an aircraft is operating within the Positive Controlled Area or omission is requested by the pilot, issue traffic advisories to all aircraft (IFR or VFR) on your frequency when in your judgment their proximity may diminish to less than the applicable separation minima. Provide this service as follows:

a. To radar identified aircraft:

(1) Azimuth from aircraft in terms of the 12-hour clock, or

(2) When rapidly maneuvering civil test or military aircraft prevent accurate issuance of traffic as in (1) above, specify the direction from an aircraft's position in terms of the eight cardinal compass points (N, NE, E, SE, S, SW, W, and NW). This method shall be terminated at the pilot's request.

(3) Distance from aircraft in miles.

(4) Direction in which traffic is proceeding and/or relative movement of traffic.

46.a.(4) Note.—Relative movement includes closing, converging, parallel same direction, opposite direction, diverging, overtaking, crossing left to right, crossing right to left.

(5) If known, type of aircraft and altitude.

46.a.(5) Reference.—Description of Aircraft Types, 88.

(6) If Mode C altitude readout is not verified, state the word "unverified" after the altitude.

46.a.(6) Note.—In a radar environment, altitude information will be ascertained by either a report or verified Mode C. Altitude readout which is unverified may still be helpful provided the pilot knows it is not verified.

Phraseology:

TRAFFIC, (number) O'CLOCK *or, when appropriate,* (direction), (number) MILES, (direction)-BOUND *and/or* (relative movement), *and if known,* (type of aircraft and altitude).

If altitude is unknown,

ALTITUDE UNKNOWN.

If altitude is unverified Mode C,

(altitude) UNVERIFIED.

46.a. Examples

"Traffic, eleven o'clock, one zero miles, southbound, converging, DC-8, one seven thousand."

"Traffic, twelve o'clock, one five miles, opposite direction, altitude unknown."

"Traffic, two o'clock, one zero miles, westbound, six thousand five hundred unverified."

"Traffic, northeast, five miles, southbound, one five thousand five hundred unverified."

"Traffic, numerous targets, vicinity of Delia Airport."

(7) When requested by the pilot, issue radar vectors to assist in avoiding the traffic, provided the aircraft to be vectored is within your area of jurisdiction or coordination has been effected with the sector/facility in whose area the aircraft is operating.

(8) If unable to provide vector service, inform the pilot.

46.a.(8) Reference.—Pilot Request, 28.

(9) If the pilot informs you he does not see the traffic you have issued, inform him when the traffic is no longer a factor.

Phraseology:

TRAFFIC NO LONGER A FACTOR,

or

(number) O'CLOCK TRAFFIC NO LONGER A FACTOR,

or

(direction) TRAFFIC NO LONGER A FACTOR.

b. To aircraft that are not radar identified:

(1) Distance and direction from fix.

(2) Direction in which traffic is proceeding.

(3) If known, type of aircraft and altitude.

(4) ETA over the fix the aircraft is approaching, if appropriate.

Phraseology:
TRAFFIC, (number) MILES/MINUTES (direction) OF (airport or fix), (direction)-BOUND, *and if known,* (type of aircraft and altitude), ESTIMATED (fix) (time),
or
TRAFFIC, NUMEROUS TARGETS VICINITY (location).
If altitude is unknown,
ALTITUDE UNKNOWN.

46.b. Examples.—
"Traffic, one zero miles east of Forsythe V-O-R, southbound, DC-8, descending to one six thousand."
"Traffic, reported one zero miles west of Downey V-O-R, northbound, Apache, altitude unknown, estimated Joliet V-O-R one three one five."
"Traffic, eight minutes west of Chicago Heights V-O-R, westbound, Mooney, eight thousand, estimated Joliet V-O-R two zero three five."

47. MERGING TARGET PROCEDURES

a. Except while they are established in a holding pattern, apply merging target procedures to all radar identified:

(1) Aircraft at 10,000 feet and above.

(2) Turbojet aircraft regardless of altitude.

47.a.(2) Reference.—Glossary (Turbojet Aircraft).

(3) Presidential aircraft regardless of altitude.

b. Issue traffic information to those aircraft listed in **a.** whose targets appear likely to merge unless the aircraft are separated by more than the appropriate vertical separation minima.

c. If the pilot requests, vector his aircraft to avoid merging with the target of previously issued traffic.

47.c. Note.—Aircraft closure rates are so rapid that when applying merging target procedures, controller issuance of traffic must be commenced in ample time for the pilot to decide if a vector is necessary.

d. If unable to provide vector service, inform the pilot.

48. HOLDING PATTERN SURVEILLANCE

Provide radar surveillance of outer fix holding pattern airspace areas, or any portions thereof, shown on your radar scope (displayed on the video map or scribed on the map overlay) whenever aircraft are holding there. Attempt to detect any that stray outside the area. If you detect an aircraft straying outside the area, assist it to return to the assigned airspace.

48. Reference.—Deviation Advisories, 663.

49. PIREP INFORMATION

Significant PIREP information includes reports of strong frontal activity, squall lines, thunderstorms, moderate to severe icing, wind shear and turbulence (including clear air turbulence) of moderate or greater intensity, or other conditions pertinent to flight safety.

49. Reference.—7210.3—820, Handling of SIGMETS and PIREPS.

a. Solicit PIREPs when requested or when one of the following conditions exist or are forecast for your area of jurisdiction:

(1) Ceilings at or below 5,000 feet. These PIREPs shall include cloud base/tops reports when feasible.

(2) Visibility (surface or aloft) at or less than 5 miles.

(3) Thunderstorms and related phenomena.

(4) Turbulence of moderate degree or greater.

(5) Icing of moderate degree or greater.

(6) Wind shear.

b. Record with the PIREPs:

(1) Time.

(2) Aircraft position.

(3) Type aircraft.

(4) Altitude.

c. Obtain PIREPs directly from the pilot, or if the PIREP has been requested by another facility, you may instruct the pilot to deliver it directly to that facility.

Phraseology:
REQUEST FLIGHT CONDITIONS. REQUEST FLIGHT CONDITIONS AT PRESENT POSITION,
or
OVER (fix),
or
ALONG PRESENT ROUTE,
or
BETWEEN (fix) and (fix).

d. Handle PIREPs as follows:

(1) Relay pertinent PIREP information to concerned aircraft in a timely manner.

(2) *EN ROUTE:* Relay all operationally significant PIREPs to the facility weather coordinator.

(3) *TERMINAL:* Relay all operational significant PIREPs to:

(a) The appropriate intrafacility positions.

(b) The FSS serving the area in which the report was obtained.

49.d.(3)(b) Note.—The FSS is responsible for Service A teletypewriter dissemination.

(c) Other concerned terminal or en route ATC facilities, including non-FAA facilities.

50. WEATHER AND CHAFF SERVICES

a. Issue pertinent information on observed/reported weather or chaff areas. Provide radar navigational guidance and/or approve deviations around weather or chaff areas when requested by the pilot. Do not use the word "turbulence" in describing radar derived weather.

(1) Issue weather and chaff information by defining the area of coverage in terms of azimuth (by referring to the 12-hour clock) and distance from the aircraft or by indicating the general width of the area and the area of coverage in terms of fixes or distance and direction from fixes.

(2) When a deviation cannot be approved as requested and the situation permits, suggest an alternative course of action.

b. In areas of significant weather, plan ahead and be prepared to suggest, upon pilot request, the use of alternative routes/altitudes.

50.b. Note.—Weather significant to the safety of aircraft includes such conditions as tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, wind shear, moderate to extreme turbulence (including CAT), and moderate to severe icing.

c. Inform any tower for which you provide approach control services if you observe any weather echoes on radar which might affect their operations.

Phraseology:

WEATHER/CHAFF AREA BETWEEN (number) O'CLOCK AND (number) O'CLOCK (number) MILES

or

(number) MILE BAND OF WEATHER/CHAFF FROM (fix or number of miles and direction from fix) TO (fix or number of miles and direction from fix)

or

(level number and intensity adjective) WEATHER ECHO BETWEEN (number) O'CLOCK AND (number) O'CLOCK, (number) MILES. MOVING (direction) AT (number) KNOTS, TOPS (altitude).

50.c. Example.—"Level five intense weather echo between eleven o'clock and one o'clock, one zero miles. Moving east at two zero knots, tops flight level three niner zero."

50.c. Note.—The third phraseology is only applicable when the radar weather echo intensity information is determined by NWS radar equipment.

50.c. Reference.—Glossary (Radar Weather Echo Intensity Levels).

51. DISSEMINATING WEATHER INFORMATION

TERMINAL

Observed elements of weather information shall be disseminated as follows:

a. General weather information, such as "large breaks in the overcast," "visibility lowering to the south," or similar statements which do not include specific values, and any elements derived directly from instruments, pilots, or radar may be transmitted to pilots or other ATC facilities without consulting the weather reporting station.

b. Specific values, such as ceiling and visibility, may be transmitted if obtained by one of the following means:

(1) You are properly certificated and acting as official weather observer for the elements being reported.

51.b.(1) Note.—USAF controllers do not serve as official weather observers.

(2) You have obtained the information from the official observer for the elements being reported.

(3) The weather report was composed or verified by the weather station.

c. Differences between weather elements observed from the tower and those reported by the weather station shall be reported to the official observer for the element concerned.

52. BIRD ACTIVITY INFORMATION

→ **a.** Issue advisory information on pilot-reported, tower-observed, or radar-observed and pilot-verified bird activity. Include position, species or size of birds, if known, course of flight, and altitude. Do this for at least 15 minutes after receipt of such information from pilots or from adjacent facilities unless visual observation or subsequent reports reveal the activity is no longer a factor.

Phraseology:

FLOCK OF (species, if known)/(size, if known) BIRDS, (number) O'CLOCK (number of miles) MILES (direction)-BOUND, LAST REPORTED AT (altitude, as determined from pilot report)

or

ALTITUDE UNKNOWN.

FLOCK OF (species, if known)/(size, if known) BIRDS (direction)-BOUND ALONG (flyway or geographical route), LAST REPORTED AT (altitude, as determined from pilot report)

or

ALTITUDE UNKNOWN.

FLOCK OF/NUMEROUS FLOCKS (species, if known)/(size, if known) BIRDS, VICINITY (location), LAST REPORTED AT (altitude, as determined from pilot report)

or

ALTITUDE UNKNOWN.

52.a. Examples.—

"Flock of geese, one o'clock, seven miles, northbound, last reported at four thousand."

"Flock of small birds, southbound along Mohawk River, last reported at three thousand."

"Numerous flocks of ducks, vicinity Lake Winnebago, altitude unknown."

b. Relay bird activity information to adjacent facilities and to FSSs whenever it appears it will become a factor in their areas.

53-54. RESERVED

Section 4. NAVAID USE LIMITATIONS

55. ALTITUDE AND DISTANCE LIMITATIONS

When specifying a route other than an established airway or route, do not exceed the limitations in the **Table** on any portion of the route which lies within controlled airspace.

55. Table.—Altitude and Distance Limitations

VOR/VORTAC/TACAN NAVAIDS
Normal Usable Altitudes and Radius Distances

Class	*Altitudes*	*Distance (miles)*
T	12,000′ and below	25
L	Below 18,000′	40
H	Below 18,000′	40
H	14,500′–17,999′	*100
H	18,000′–FL 450	130
H	Above FL 450	100

*Applicable only within the conterminous 48 states.

L/MF Radio Beacon (RBN)
Usable Radius Distances for All Altitudes

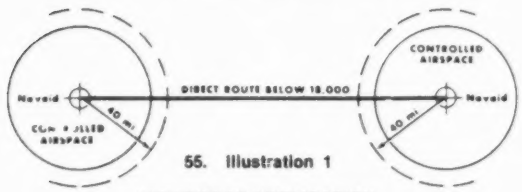
Class	*Power (watts)*	*Distance (miles)*
CL	Under 25	15
MH	Under 50	25
H	50–1,999	50
HH	2,000 or more	75

ILS
Usable Height and Distance*

Height above transmitter	*Distance (miles) from transmitter*
4,500	10 (for Glide Slope)
4,500	18 (for Localizer)

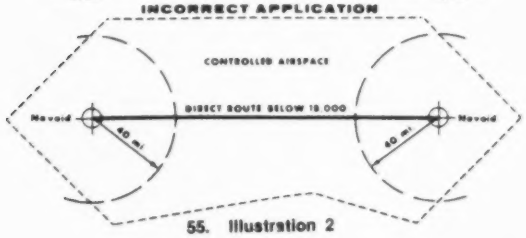
*Use current flight check height/altitude limitations if different from the above minima.

CORRECT APPLICATION



55. Illustration 1

INCORRECT APPLICATION



55. Illustration 2

56. EXCEPTIONS

Altitude and distance limitations need not be applied when:

a. Routing is initiated by ATC and radar monitoring is provided.

b. Routing is requested by the pilot and radar flight following is provided for air traffic control purposes.

56.b. Note.—**Paragraph 290.i.** requires radar monitoring be provided at FL 450 and below to aircraft on random (impromptu) RNAV routes. **Paragraph 720.a.** requires radar separation be provided for these routes at FL450 and below.

c. Operational necessity requires and approval has been obtained from the Frequency Management and Flight Inspection Offices to exceed them.

d. Requested routing is via an MTR.

57. CROSSING ALTITUDE

Use an altitude consistent with the limitations of the aid, when clearing an aircraft to cross or hold at a fix.

→58. VFR-ON-TOP

Use a route not meeting service volume limitations only if an aircraft requests to operate "VFR-on-top" on this route.

58. Note.—Aircraft equipped with TACAN-only are expected to:

a. Define route of flight between TACAN or VORTAC NAVAIDs in the same manner as VOR-equipped aircraft.

b. Except in positive control areas, submit requests for "VFR-on-top" flight where insufficient TACAN or VORTAC NAVAIDs exist to define the route.

59. FIX USE

Request aircraft position reports only over fixes shown on charts used for the altitude being flown, except as follows:

59. Note.—Waypoints filed in random RNAV routes automatically become compulsory reporting points for the flight unless otherwise advised by ATC.

a. Unless the pilot requests otherwise, use only those fixes shown on High Altitude En Route Charts, High Altitude Instrument Approach Procedures Charts, and SID Charts when clearing military turbojet single-piloted aircraft.

84. Table.—ICAO Phonetics

A—Alfa	N—November
B—Bravo	O—Oscar
C—Charlie	P—Papa
D—Delta	Q—Quebec
E—Echo	R—Romeo
F—Foxtrot	S—Sierra
G—Golf	T—Tango
H—Hotel	U—Uniform
I—India	V—Victor
J—Juliett	W—Whiskey
K—Kilo	X—X-ray
L—Lima	Y—Yankee
M—Mike	Z—Zulu

85. NUMBERS USAGE

State numbers as follows:

a. Serial numbers—The separate digits.

85.a. Examples.—

Number	*Statement*
11,495	"One one four niner five."
20,069	"Two zero zero six niner."

b. Altitudes or flight levels:

(1) Altitudes—The separate digits of the thousand plus the hundreds.

85.b.(1) Example.—

Altitude	*Statement*
17,900	"One seven thousand niner hundred."

(2) Flight levels—The words "flight level" followed by the separate digits of the flight level.

85.b.(2) Examples.—

Flight Level	*Statement*
180	"Flight level one eight zero."
275	"Flight level two seven five."

(3) MDA/DH Altitudes—The separate digits of the MDA/DH altitude.

85b.(3) Examples.—

MDA/DH Altitude	*Statement*
1,320	"Published minimum descent altitude, one three two zero"
486	"Published decision height, four eight six"

c. Time:

(1) General time information—The 4 separate digits of the hour and minutes based on the 24-hour clock in terms of Greenwich Mean Time (GMT).

85.c.(1) Examples.—

Time (12 hr.)	*Time (24 hr.)*	*Statement*
1:15 a.m.	0115	"Zero one one five."
1:15 p.m.	1315	"One three one five."

(2) Upon request—The 4 separate digits of the hours and minutes in terms of GMT, followed by local standard time equivalents.

85.c.(2) Example.—

Time	*Statement*
1430 PST (2230 GMT)	"Two two three zero Greenwich, one four three zero Pacific."

(3) Time check—The word "time" followed by the 4 separate digits of the hour, minutes, and nearest quarter minute.

85.c.(3) Example.—

Time	*Statement*
1415¾	"Time, one four one five and three-quarters."

(4) Abbreviated time—The separate digits of the minutes only.

85.c.(4) Examples.—

Time	*Statement*
1415	"One five."
1420	"Two zero."

d. Field elevation—The words "field elevation," followed by the separate digits of the elevation.

85.d. Examples.—

Elevation	*Statement*
17 feet	"Field elevation, one seven."
817 feet	"Field elevation, eight one seven."
2,817 feet	"Field elevation, two eight one seven."

e. The number "0," except where it appears in group form—The word "zero."

85.e. Example.—

"Field elevation one six zero."

f. Altimeter setting—The word "altimeter" followed by the separate digits of the altimeter setting.

85.f. Example.—

Setting	*Statement*
30.01	"Altimeter, three zero zero one."

g. Surface wind—The word "wind" followed by separate digits of the indicated wind direction to the nearest 10-degree multiple, the word "at," and the separate digits of the indicated velocity in knots.

85.g. Examples.—

"Wind zero three zero at two five."

"Wind two seven zero at one five peak gusts three five."

h. Heading— The word "heading" followed by the 3 separate digits of the number of degrees, omitting the word "degrees." Use heading 360 degrees to indicate a north heading.

85.h. Examples.—

Heading	*Statement*
5 degrees	"Heading zero zero five."
30 degrees	"Heading zero three zero."
360 degrees	"Heading three six zero."

i. Radar beacon codes—The separate digits of the 4-digit code.

85.i. Examples.—

Code	*Statement*
1000	"One zero zero zero."
2100	"Two one zero zero."

j. Runways—The word "runway," followed by the separate digits of the runway designation. For a parallel runway, state the word "left," "right," or "center" if the letter "L," "R," or "C" is included in the designation. *USAF:* Prefix the word "zero" for runways designated 1 through 9.

85.j. Examples.—

Designation	*Statement*
3	"Runway Three."
	USAF: "Runway Zero Three."
8L	"Runway Eight Left."
	USAF: "Runway Zero Eight Left."
27R	"Runway Two Seven Right."

k. Frequencies—The separate digits of the frequency, inserting the word "point" where the decimal point occurs. Omit digits after the second digit to the right of the decimal point. When the frequency is in the L/MF band, include the word "kiloHertz."

85.k. Examples.—

Frequency		*Statement*
126.55	MHz	"One two six point five five."
369.0	MHz	"Three six niner point zero."
121.5	MHz	"One two one point five."
135.275	MHz	"One three five point two seven."
302	kHz	"Three zero two kiloHertz."

→ **l.** Speeds—

(1) The separate digits of the speed followed by "knots", except as required by **821.**, Speed Adjustment Methods.

85.l.(1) Examples.—

Speed	*Statement*
250	"Two five zero knots."
190	"One niner zero knots."

(2) The separate digits of the mach number preceded by "mach."

85.l.(2) Examples.—

Mach Number	*Statement*
1.5	"Mach one point five."
0.64	"Mach point six four."
0.7	"Mach point seven."

m. Miles—The separate digits of the mileage followed by the word mile.

85.m. Examples.—

"Three zero mile arc east of Nottingham."

"Traffic, one o'clock, two five miles, northbound, DC-8, flight level two seven zero."

86. FACILITY IDENTIFICATION

Identify facilities as follows:

a. Airport traffic control towers—State the name of the facility, followed by the word "tower." Where military and civil airports are located in the same general area and have similar names, state the name of the military service followed by the name of the military facility and the word "tower."

86.a. Examples.—

"Columbus Tower."

"Barksdale Tower."

"Navy Jacksonville Tower."

b. Air route traffic control centers—State the name of the facility, followed by the word "center."

c. Approach control facilities, including RAPCONs, RATCFs, and ARACs—State the name of the facility, followed by the word "approach." Where military and civil facilities are located in the same general area and have similar names, state the name of the military service, followed by the name of the military facility and the word "approach."

86.c. Examples.—

"Denver Approach."

"Griffiss Approach."

"Navy Jacksonville Approach."

d. Functions within a terminal facility—State the name of the facility, followed by the name of the function.

86.d. Examples.—

"Boston Departure."

"La Guardia Clearance Delivery."

"O'Hare Ground."

e. When calling or replying on an interphone line which connects only 2 facilities, you may omit the facility name.

86.e. Example.—

"Bradford High, handoff."

f. Communications stations:

(1) FAA flight service stations—State the name of the station, followed by the word "radio."

(2) Air Force—State the name of the station, followed by the word "airways."

86.f.(2) Example.—

"Brookley Airways."

(3) Navy—State the word "Navy," followed by the name of the station and the word "radio."

86.f.(3) Example.—
"Navy Jacksonville Radio."

g. Radar facilities having ASR or PAR but not providing approach control service—State the name of the facility, followed by the letters "G-C-A."

86.g. Examples.—
"Chanute G-C-A."
"Corpus Christi G-C-A."
"Davison G-C-A."

→87. AIRCRAFT IDENTIFICATION

Identify aircraft as follows: Use the full identification in reply to aircraft with similar sounding identifications. For other aircraft, the same identification may be used in reply that the pilot used in his initial call-up except use the correct identification after communications have been established.

87. Reference.—Abbreviated Transmissions, 76.

a. Civil—State the aircraft type, model or manufacturer's name, or if none of these are known, the letters/numbers of the aircraft registration.

87.a. Examples.—
"Jet Commander One Four Two Four."
"Douglas Three Zero Five Romeo."
"Bonanza One Two Three Four Tango."
"November One Two Three Four Golf."

87.a.Note.—The prefix "November" denotes a U.S. aircraft registry and should be used only if the aircraft type, model, or manufacturer's name is not known.

(1) Air carrier and other civil aircraft having FAA authorized call-signs—State the call-sign followed by the flight number in group form.

87.a.(1) Examples.—
"American Five Twenty-one."
"Commuter Six Eleven."
"General Motors Thirty-seven."

(2) If aircraft identification becomes a problem when the procedures specified in (1) are used, the call sign shall be restated after the flight number of the aircraft involved.

87.a.(2) Examples.—
"American Five Twenty-one American."
"Commuter Six Eleven Commuter."
"General Motors Thirty-seven General Motors."

87.a.(2) Reference.—7210.3—210, Aircraft Identification Problems.

(3) Air taxi and commercial operators not having FAA authorized call signs—State the prefix 'TANGO' on initial contact, if used by the pilot, followed by the registration number. The prefix may be dropped in subsequent communications.

87.a.(3). Examples.—
"Tango Mooney Five Five Five Two Quebec."
"Tango One Two Three Four."

b. Civilian airborne ambulance—State the word "LIFEGUARD" followed by type, digits and letters of the registration number.

87.b. Example.—
"LIFEGUARD Cessna Two Six Four Six."

c. U.S. military—State one of the following:

(1) The service name, followed by the word "copter," when appropriate, and the last 5 digits of the serial number.

87.c.(1) Examples.—
"Navy Five Six Seven One Three."
"Coast Guard Six One Three Two Seven."
"Air Guard One Three Five Eight Six."
"Army Copter Three Two One Seven Six."

87.c.(1). Note.—If aircraft identification becomes a problem, procedures in 87.a.(2) will apply.

(2) Special military operations—State one of the following followed by the last 5 digits of the serial number:

(a) Air evacuation flights— "AIR EVAC," "MARINE AIR EVAC," or "NAVY AIR EVAC."

87.c.(2)(a) Example.—
"AIR EVAC One Seven Six Five Two."

(b) Rescue flights—(Service name) "RESCUE."

87.c.(2)(b) Example.—
"Air Force RESCUE Six One Five Seven Niner."

(c) Military Airlift Command—"MAC."

87.c.(2)(c) Example.—
"MAC Seven Eight Five Six Two."

(d) Special Air Mission—"Sam."

87.c.(2)(d) Example.—
"SAM Niner One Five Six Two."

(e) USAF Contract Aircraft—"LOGAIR."

87.c.(2)(e) Example.—

"LOGAIR Seven Five Eight Two Six."

(3) Military tactical and training:

(a) U.S. Air Force, Air National Guard, Military District of Washington priority aircraft, and USAF civil disturbance aircraft—Pronounceable words of 3, 4, 5 or 6 letters followed by a 4, 3, 2, or 1-digit number.

87.c.(3)(a) Examples.—

"Paul Two Zero."

"Pat One Five Seven."

"Gaydog Four."

87.c.(3)(a) Note.—When the "Z" suffix described in paragraph 161 is added to identify aircraft piloted by USAF undergraduate pilots, the call sign will be limited to a combination of six characters.

(b) Navy or Marine fleet and training command aircraft—The service name and 2 letters, or a digit and a letter (use letter phonetic equivalents), followed by 2 or 3 digits.

87.c.(3)(b) Examples.—

"Navy Golf Alpha Two One."

"Marine Four Charlie Two Three Six."

(c) NORAD interceptors—An assigned double letter 2-digit flight number.

87.c.(3)(c) Example.—

"Alpha Kilo One Five."

d. Foreign registry—State one of the following:

(1) Civil—The letters or digits of the aircraft registration or call sign.

87.d.(1) Example.—

"C-F-L-R-B."

(2) Air carrier—The abbreviated name of the operating company, followed by:

(a) The letters or digits of the registration or call sign.

87.d.(2)(a) Example.—

"Air France F-L-R-L-G."

(b) The flight number in group form.

87.d.(2)(b) Example.—

"Scandinavian Sixty-eight."

(3) Military—Except Canada, the name of the country and the military service followed by the separate digits or letters of the registration or call sign. Canadian Armed Force aircraft shall be identified by the word "Canforce" followed by the separate digits of the serial number, except that the Transport Command of the Canadian Armed Force shall be identified by the words "Canadian Military" and the Canadian Coast Guard shall be identified as "Canadian Coast Guard" followed by the separate digits of the serial number.

87.d.(3) Examples.—

"CANFORCE Five Six Two Seven."

"Brazilian Air Force Five Three Two Seven Six."

e. Presidential aircraft and Presidential family aircraft:

(1) When the President is aboard a military aircraft, state the name of the military service, followed by the word "One."

87.e.(1) Examples.—

"Air Force One." "Army One." "Marine One."

(2) When the President is aboard a civil aircraft, state the words "Executive One."

(3) When a member of the President's family is aboard any aircraft, if the U.S. Secret Service or the White House Staff determines it is necessary, state the words "Executive One Foxtrot."

f. Vice Presidential aircraft:

(1) When the Vice President is aboard a military aircraft, state the name of the military service, followed by the word "Two."

87.f.(1) Examples.—

"Air Force Two." "Army Two." "Marine Two."

(2) When the Vice President is aboard a civil aircraft, state the words "Executive Two."

(3) When a member of the Vice President's family is aboard any aircraft, if the U.S. Secret Service or the White House Staff determines it is necessary, state the words "Executive Two Foxtrot."

g. Other special flights:

(1) Department of Energy flights—State the letters "RAC" (use phonetic alphabet equivalents) followed by the last 4 separate digits of the aircraft registration number.

Chapter 3. IFR OPERATIONS

Section 1. GENERAL

180. IFR AND SPECIAL VFR

Separate IFR and Special VFR aircraft by the minima and methods prescribed in this chapter.

181. DME

Use DME procedures and minima only when direct pilot-controller communications are maintained.

→182. POSITIVE CONTROL AREA RESTRICTIONS

Do not apply visual separation or issue VFR or "VFR-on-top" clearances in positive control areas.

183. DELAY POTENTIAL

Advise supervisory/flow control personnel when conditions within your area of responsibility indicate a potential for delay situations.

184-189. RESERVED

Section 2. IFR CLEARANCES

190. CLEARANCE ITEMS

Issue the following clearance items, as appropriate, in the order listed below:

a. Aircraft identification.

b. Clearance limit.

c. Departure procedure or SID.

d. Route of flight including PDR/PDAR/PAR when applied.

e. Altitude data in the order flown.

f. *USAF:* When issuing a clearance to an airborne aircraft containing an altitude assignment, do not include more than one of the following in the same transmission:

(1) Frequency change.

(2) Transponder change.

(3) Heading.

(4) Altimeter setting.

(5) Traffic information containing an altitude.

g. Holding instructions.

190.g. Reference.—Delay Anticipated, 320.

h. Any special information.

i. Frequency and beacon code information.

191. ROUTE OR ALTITUDE AMENDMENTS

a. Amend route of flight in a previously issued clearance by one of the following:

(1) State which portion of the route is being amended and then state the amendment.

Phraseology:

CHANGE (portion of route) TO READ (amended route).

(2) State the amendment to the route and then state that the rest of the route is unchanged.

Phraseology:

(Amended route), REST OF ROUTE UNCHANGED.

(3) Issue the entire route by stating the amendment.

191.a. Examples.—

Cessna 21A has been cleared to the Airville airport via V41 Delta VOR V174 Alfa VOR, direct Airville airport, maintain 9000. After takeoff the aircraft is rerouted via V41 Frank intersection V71 Delta VOR V174 Alfa VOR. The controller issues one of the following as amended clearance:

"Cessna Two One Alpha change V41 Delta to read V41 Frank V71 Delta."

"Cessna Two One Alpha cleared via V41 Frank V71 Delta rest of route unchanged."

"Cessna Two One Alpha cleared via V41 Frank V71 Delta V174 Alfa VOR direct Airville airport, maintain niner thousand."

b. When route or altitude in a previously issued clearance is amended, restate all applicable altitude restrictions.

191.b. Example.—

A departing aircraft is cleared to cross Ollis intersection at or above 3,000; Gordonsville VOR at or above 12,000; maintain FL 200. Shortly after departure, the altitude to be maintained is changed to FL 240. Because altitude restrictions remain in effect, the controller issues amended clearance as follows:

"Cross Ollis intersection at or above three thousand; cross Gordonsville VOR at or above one two thousand; maintain flight level two four zero."

Shortly after departure, altitude restrictions are no longer applicable, the controller issues amended clearance as follows:

"Climb and maintain flight level two four zero."

191.b. Note.—Restating previously issued altitude to "maintain" is an amended clearance. If altitude to "maintain" is changed or restated, whether prior to departure or while airborne, and previously issued altitude restrictions are omitted, altitude restrictions are canceled, including SID altitude restrictions, if any.

192. FIX DESCRIPTION

Use specific terms to describe a fix. Do not use expressions such as "passing Victor Twelve" or "passing J Eleven."

192. Reference.—Fix Use, 59; NAVAID Fixes, 102.

193. CLEARANCE PREFIX

a. Prefix a clearance, information, or a request for information which will be relayed to an aircraft by stating "A-T-C clears," "A-T-C advises," or "A-T-C requests."

b. Omit the term "ATC" when issuing a clearance, information, or a request for information to an ATC facility or to an aircraft by direct ATC communications.

Section 7. LATERAL SEPARATION

280. SEPARATION METHODS

Separate aircraft by one of the following methods:

a. Clear aircraft on different airways or routes whose widths or protected airspace do not overlap.

280.a. **Note.**—Airspace protected for airways is based on airway widths described in FAR 71.5 and airspace protected for routes will be consistent with those widths. Airspace to be protected for RNAV routes, including SIDs and STARS, is defined in Handbook 7110.18.

b. Clear aircraft below 18,000 to proceed to and report over or hold at different geographical locations determined visually or by reference to NAVAIDs.

c. Clear aircraft to hold over different fixes whose holding pattern airspace areas do not overlap each other or other airspace to be protected.

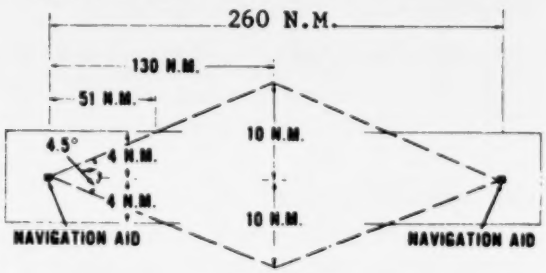
d. Clear departing aircraft to fly specified headings which diverge by at least 45 degrees.

281. MINIMA ALONG OTHER THAN ESTABLISHED AIRWAYS OR ROUTES

Protect airspace along other than established airways or routes as follows:

281. **Reference.**—Glossary (Airway, Route).

a. Direct courses and course changes of 15 degrees or less:



281.a. Illustration.

(1) Via NAVAIDs or radials FL 600 and below—*4 miles* on each side of the route to a point 51 miles from the NAVAID, then increasing in width on a 4½ degree angle to a width of *10 miles* on each side of the route at a distance of 130 miles from the NAVAID.

(2) Via degree-distance fixes for aircraft authorized under **294.**

(a) Below FL 180—*4 miles* on each side of the route.

(b) FL 180 to FL 600 inclusive—*10 miles* on each side of the route.

(3) Via degree-distance fixes for RNAV flights above FL 450—*10 miles* on each side of the route.

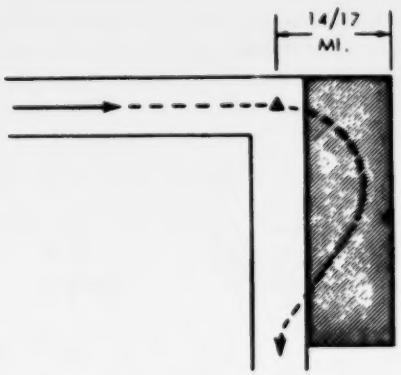
281.a.(3). **Note.**—Degree-distance RNAV flight (random routes) at FL 450 and below are provided radar separation.

b. When course change is 16 degrees through 90 degrees, protect the airspace on the overflown side, beginning at the point where the course changes, as follows:

(1) Below FL 180—same as **a.**(1) or (2).

(2) FL 180 to FL 230 inclusive—*14 miles.*

(3) Above FL 230 to FL 600 inclusive—*17 miles.*



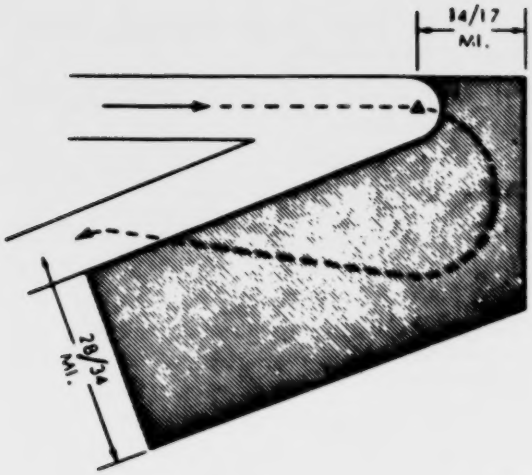
281.b. Illustration.

c. When course change is 91 degrees through 180 degrees, protect the airspace on the overflown side, beginning at the point where the course changes, as follows:

(1) Below FL 180—same as **a.**(1) or (2).

(2) FL 180 to FL 230 inclusive—*28 miles.*

(3) Above FL 230 to FL 600 inclusive—*34 miles.*

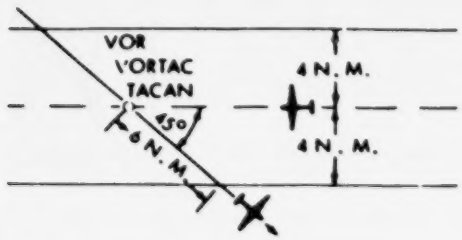


281.c. Illustration.

d. After the course changes specified in **b.** or **c.** have been completed and the aircraft is back on course, the appropriate minima in **a.** may be used.

→ 282. MINIMA ON DIVERGING RADIALS

a. Consider separation to exist between aircraft established on radials of the same NAVAID that diverge by at least 15 degrees when either aircraft is clear of the airspace to be protected for the other aircraft.



282.a. Illustration.

282.a. Note.—The procedure may be applied to converging as well as diverging aircraft. For example, the aircraft depicted 6 miles from the NAVAID in Illustration 282.a. would require vertical separation until reaching the 6 mile point. Reversing direction, the same aircraft would require vertical separation before passing the 6 mile point.

b. Use the **Tables** to determine the distance required for various divergence angles to clear the airspace to be protected. For divergence that falls between two values, use the lesser divergence value to obtain the distance.

282.b. Table 1.—Non-DME Divergence-Distance Minima

Divergence (Degrees)	*Distance (NM)*
15	16
20	12
25	10
30	8
35	7
45	6
55	5
90	4

282.b. Table 1. Note.—This Table is for non-DME application only.

282.b. Table 2.—Divergence-Distance Minima

Divergence (degrees)	*Distance (NM)*	
	Below FL 180	*FL 180 through FL 450*
15	17	18
20	13	15
25	11	13
30	9	11
35	8	11
45	7	11
55	6	11
90	5	11

282.b. Table 2. Note.—This Table is for DME application and compensates for DME slant-range error.

282.b. Note.—For altitudes of 3,000 feet or less above the elevation of the NAVAID, DME slant-range error is negligible and the values in 282.b. Table 1. may be used.

283. DME ARC MINIMA

Apply lateral DME separation by requiring aircraft using DME to fly an arc about a NAVAID at a specified distance using the following minima:

283. Reference.—NAVAID Terms, 101.

a. Between different arcs about a NAVAID regardless of direction of flight:

(1) At 35 miles or less from the NAVAID—*10 miles.*

This illustration depicts the application of timed approach procedures using a holding/approach fix on a bearing of an NDB and applying a combination of longitudinal and vertical separation. The #3 aircraft has been instructed to descend to 2,000 after the #2 aircraft has reported departing the holding/approach fix inbound and leaving 2,000 at Point A. The #2 aircraft has departed the holding/approach fix inbound at the designated time, maintaining 2,000 until cleared for approach at Point A. The #1 aircraft has been sighted, enabling the controller to issue approach clearance to the #2 aircraft at Point A.

c. Release the aircraft to the tower before it reaches the final approach fix.

452. TIME CHECK

Issue a time check to an aircraft before specifying a time to leave the approach fix inbound unless the aircraft is vectored to the final approach course.

453. INTERVAL MINIMA

Use a *2-minute* or *5-mile* radar interval (except for a small aircraft behind a heavy aircraft—use a *3-minute* or *6-mile* radar interval) as the minimum between successive approaches and increase the interval, as necessary, taking into account the:

453. Note.—Increased separation is required for small aircraft behind heavy aircraft because of the possible effects of wake turbulence.

453. Reference.—Approach Separation Responsibility, 795.

a. Relative speeds of aircraft concerned.

b. Existing weather conditions.

c. Distance between approach fix and airport.

d. Type of approach being made.

454. MISSED APPROACHES

a. If weather conditions are such that an aircraft will likely miss an approach, issue an alternative missed approach procedure to the next aircraft.

b. If an aircraft misses an approach, allow the next aircraft to continue approach if it has been assigned an alternative missed approach procedure. Retain radar control or hold any remaining aircraft at assigned altitudes until traffic conditions permit issuance of approach clearances.

c. When **451.b.** is applied and the first aircraft misses approach, retain radar control or clear the second aircraft to maintain the last assigned altitude (minimum holding altitude) and return to the holding/approach fix to hold until traffic conditions permit issuance of approach clearances.

455. LEVEL FLIGHT RESTRICTION

If the weather report indicates an aircraft will be in IFR conditions over the final approach fix when **451.b.** is applied, clear the second aircraft for an approach early enough to allow at least 1 minute of level flight before crossing the final approach fix.

456. SEQUENCE INTERRUPTION

Interrupt the established timed approach sequence if necessary to allow an aircraft to execute a different type of approach.

457-469. RESERVED

Section 16. SPECIAL VFR

470. AUTHORIZATION

Except where prohibited by FAR 93.113, you may authorize Special VFR operations in weather conditions less than basic VFR minima only as follows:

a. Within control zones.

b. When requested by the pilot.

c. On the basis of weather conditions reported at the airport of intended landing/departure, or

470.c. Reference.—Climb to VFR, 472; Ground Visibility Below One Mile, 477.

d. When weather conditions are not reported at the airport of intended landing/departure and the pilot advises he is unable to maintain VFR and requests Special VFR.

Phraseology:

CLEARED TO ENTER/OUT OF/THROUGH CONTROL ZONE,

and, if required,

(direction) OF (airport name) AIRPORT (specified routing),

and

MAINTAIN SPECIAL V-F-R CONDITIONS WHILE IN CONTROL ZONE.

→ **470. Note.**—FAR 91.107(e) limits the use of Special VFR by pilots of fixed-wing aircraft to daylight hours except where the pilot is instrument rated and currently qualified, and the aircraft is equipped for IFR flight.

471. LOCAL OPERATIONS

Authorize local Special VFR operations for a specified period (series of landings and takeoffs, etc.) upon request, if the aircraft can be recalled when traffic or weather conditions require. Where warranted, Letters of Agreement may be consummated.

Phraseology:

LOCAL SPECIAL V-F-R OPERATIONS IN THE IMMEDIATE VICINITY OF (airport name) AIRPORT ARE AUTHORIZED UNTIL (time). MAINTAIN SPECIAL V-F-R CONDITIONS.

471. Reference.—7210.3—431, Appropriate Subjects.

472. CLIMB TO VFR

Authorize an aircraft to climb to VFR upon request if the only weather limitation is restricted visibility.

Phraseology:

CLIMB TO V-F-R WITHIN THE CONTROL ZONE/WITHIN (a specified distance within control zone) MILES FROM (airport name) AIRPORT, MAINTAIN SPECIAL V-F-R CONDITIONS UNTIL REACHING V-F-R.

473. SEPARATION

Apply approved separation between:

a. Special VFR aircraft.

b. Special VFR aircraft and IFR aircraft.

473. Note.—Approved separation is that prescribed for IFR and Special VFR in **180.** and **474.** Radar vectors are authorized as prescribed in **680.** (See paragraph 1.h.)

474. ALTITUDE ASSIGNMENT

Do not assign a fixed altitude when applying vertical separation, but clear the Special VFR aircraft at or below an altitude which is at least 500 feet below any conflicting IFR traffic but not below the minimum safe altitude prescribed in FAR 91.79.

Phraseology:

MAINTAIN SPECIAL V-F-R CONDITIONS AT OR BELOW (altitude).

474. Note 1.—Special VFR aircraft are not assigned fixed altitudes because of the clearance from clouds requirement.

474. Note 2.—The minimum safe altitudes are (1) over congested areas, an altitude at least 1,000 feet above the highest obstacle, and (2) over other than congested areas, an altitude at least 500 feet above the surface.

475. SPECIAL VFR HELICOPTER SEPARATION

Control a Special VFR helicopter by Special VFR procedures unless other procedures are contained in a Letter of Agreement.

475. Note.—Control of IFR helicopters is governed by nonradar or radar procedures and minima.

475. Reference.—*TERMINAL:* Special VFR Helicopter Separation, Chapter 5, Section 14.

476. PRIORITY

a. FW/SVFR flights may be approved only if arriving and departing IFR aircraft are not delayed.

476.a. Example 1.—A FW/SVFR aircraft has been cleared to enter the control zone and subsequently an IFR aircraft is ready to depart or is in position to begin an approach. Less overall delay might accrue to the IFR aircraft if the FW/SVFR aircraft is allowed to proceed to the airport and land, rather than leave the control zone or be repositioned to provide IFR priority.

476.a. Example 2.—A FW/SVFR aircraft is number one for takeoff and located in such a position that the number two aircraft, an IFR flight, cannot taxi past to gain access to the runway. Less overall delay might accrue to the IFR aircraft by releasing the FW/SVFR departure rather than by having the aircraft taxi down the runway to a turnoff point so that the IFR aircraft could be released first.

476.a. Note.—The priority afforded IFR aircraft over FW/SVFR aircraft is not intended to be so rigidly applied that it causes grossly inefficient use of airspace. If better overall efficiency will be gained thereby, the controller has the prerogative of allowing completion of the FW/SVFR operation already in progress when an IFR aircraft becomes a factor.

b. When clearance cannot be granted for a FW/SVFR flight because of IFR traffic, inform the aircraft of the anticipated delay. Do not issue EAC, EFC, or expected departure time.

Phraseology:

EXPECT (number) MINUTES DELAY, (additional instructions as necessary).

477. GROUND VISIBILITY BELOW ONE MILE

When the ground visibility is officially reported at an airport as less than 1 mile, treat requests for Special VFR operations at that airport by other than helicopters as follows:

477. Note.—Far 91 does not prohibit helicopter Special VFR flights when visibility is less than 1 mile.

a. Inform departing aircraft that ground visibility is less than 1 mile and that a clearance cannot be issued.

b. Inform arriving aircraft, operating outside of the control zone, that ground visibility is less than 1 mile and that, unless an emergency exists, a clearance cannot be issued.

c. Inform arriving aircraft, operating within the control zone, that ground visibility is less than 1 mile, and ask if the aircraft can depart the control zone with a flight visibility of at least 1 mile. If the reply is "yes," issue a clearance out of control zone. If the reply is "no," or an emergency exists, issue a clearance as soon as traffic conditions permit.

d. Authorize scheduled air carrier aircraft in the United States to conduct operations if ground visibility is not less than ½ statute mile.

477.d. Note.—FAR 121 permits landing or take-off by domestic scheduled air carriers where a local surface restriction to visibility is not less than ½ statute mile, provided all turns after takeoff or before landing and all flights beyond 1 statute mile from the airport boundary can be accomplished above or outside the area so restricted. The pilot is solely responsible for determining if the nature of the visibility restriction will permit compliance with the provisions of FAR 121.

e. Clear an aircraft to fly through the control zone if he reports flight visibility is at least 1 statute mile.

478. FLIGHT VISIBILITY BELOW ONE MILE

When weather conditions are not officially reported at an airport and the pilot advises the flight visibility is less than 1 statute mile, treat requests for Special VFR operations at that airport by other than helicopters as follows:

478. Note.—FAR 91 prescribes use of officially reported ground visibility at airports where it is provided, and landing or take-off "flight visibility" where it is not, as the governing ground visibility for basic and Special VFR operations.

a. Inform departing aircraft that a clearance cannot be issued.

b. Inform arriving aircraft operating outside of the control zone that a clearance cannot be issued unless an emergency exists.

c. Ask an arriving aircraft operating within a control zone if he can depart the control zone with a flight visibility of at least 1 statute mile. If the aircraft cannot depart the control zone accordingly, or an emergency exists, issue a clearance as soon as traffic conditions permit.

479. RESERVED

Section 17. FIXED-WING SPECIAL IFR

480. AUTHORIZATION

a. Where Special VFR operations are prohibited by FAR 93.113, you may authorize Special IFR operations in weather conditions less than basic VFR minima for fixed-wing aircraft operating under the terms of a Certificate of Waiver to FAR 91.119(a) (1).

480.a. Note.—FAR 93.113 lists specific control zone locations in which FW/SVFR flight is prohibited. However, certain fixed-wing aircraft may obtain waivers to FAR 91 to conduct FW/SIFR operations. These waivers may be granted for operations conducted by IFR qualified pilots in IFR equipped aircraft and by pilots of agricultural and industrial aircraft. This is not an exemption from FAR 93.

b. Authorize FW/SIFR operations only within control zones.

c. Handle FW/SIFR operations in accordance with a Letter of Agreement.

Phraseology:

CLEARED FOR (coded arrival or departure procedure) ARRIVAL/DEPARTURE, (additional instructions as required).

CLEARED TO ENTER/OUT OF CONTROL ZONE VIA (routing),

or

(direction) OF (airport name) AIRPORT, (specified routing).

480.c. Reference.—7210.3—440, Fixed-Wing/Special IFR (FW/SIFR) Letters of Agreement.

481. SEPARATION

a. Consider FW/SIFR flights as IFR operations and, except as set forth in **b.**, provide approved separation accordingly.

b. Do not assign a fixed altitude when applying vertical separation, but clear the FW/SIFR aircraft at or below an altitude which is at least 500 feet below any conflicting IFR traffic but not below the minimum safe altitude prescribed in FAR 91.79.

Phraseology:

MAINTAIN AT OR BELOW (altitude).

481.b. Note 1.—Special IFR aircraft are not assigned fixed altitudes because of the clearance from clouds requirement.

481.b. Note 2.—The minimum safe altitudes are (1) over congested areas, an altitude at least 1,000 feet above the highest obstacle, and (2) over other than congested areas, an altitude at least 500 feet above the surface.

482-489. RESERVED

Section 18. VISUAL SEPARATION AND VFR

490. VISUAL SEPARATION

Aircraft may be separated by visual means, as provided in this paragraph, when other approved separation is assured before and after the application of visual separation. To ensure that other separation will exist, consider aircraft performance, routes of flight, and weather conditions. Weather conditions must allow the aircraft to remain within sight until other separation exists. Do not apply visual separation between successive departures when departure routes and/or aircraft performance preclude maintaining separation.

490. References.—Traffic Advisories, 46; Visual Approaches, 430, 796. Glossary (Visual Approach, Visual Separation).

a. *TERMINAL:* You may apply visual separation between aircraft under your facility's control within the terminal area, provided:

(1) You are in communication with at least one of the aircraft involved or have the capability to communicate instantaneously as prescribed in paragraph **983.a.** (2), and

(2) You see the aircraft and maintain visual separation between them, or

(3) A pilot sees another aircraft and you instruct him to maintain visual separation from it as follows:

(a) Tell the pilot about the other aircraft including position, direction and, unless it is obvious, the other aircraft's intention.

(b) Obtain acknowledgement from the pilot that the other aircraft is in sight.

(c) Instruct the pilot to maintain visual separation from that aircraft.

(d) Advise the pilot if the radar targets appear likely to converge.

490.a.(3)(d) Note.—Issue this advisory in conjunction with the instruction to maintain visual separation, or thereafter if the controller subsequently becomes aware that the targets are merging.

(e) If the aircraft are on converging courses, inform the other aircraft of the traffic and that visual separation is being applied.

Phraseology:

TRAFFIC, (clock position and distance), (direction)-BOUND, (type of aircraft), (intentions and other relevent information). *If applicable,* ON CONVERGING COURSE.

DO YOU HAVE IT IN SIGHT?

If the answer is in the affirmative, MAINTAIN VISUAL SEPARATION FROM THAT TRAFFIC.

If aircraft are on converging courses, advise other aircraft:

TRAFFIC, (clock position and distance), (direction)-BOUND, (type of aircraft). HAS YOU IN SIGHT AND WILL MAINTAIN VISUAL SEPARATION.

b. *EN ROUTE:* You may use visual separation in conjunction with visual approach procedures.

490.b. Reference—Visual Approaches, 430, 796.

c. You may authorize a nonapproach control tower to provide visual separation between two aircraft within a control zone provided other separation is assured before and after the application of visual separation. Visual separation may be authorized between:

(1) An arriving and a departing aircraft when the tower has the arrival in sight.

(2) A departure and a departure when weather is at or above VFR minima.

(3) An arrival and an arrival provided the tower has both aircraft in sight and visual separation can be applied.

Phraseology:

VISUAL SEPARATION APPROVED BETWEEN (identification) AND (identification),

and for departing aircraft

(departing/succeeding aircraft) RELEASED YOUR DISCRETION.

490.c. Note.—Separation of IFR aircraft before and after application of visual separation is an IFR control function (approach/departure/en route). A nonapproach control tower controller by accepting authorization for visual separation becomes responsible for ensuring that separation. Separation requirements also apply to VFR aircraft when IFR, TCA, or Stage III separation is prescribed. (See 180, 435, 680, 796, and 1280–1287.)

→ 491. VFR CONDITIONS

a. You may clear aircraft to maintain "VFR conditions" if one of the following conditions exists:

(1) The pilot of an aircraft on an IFR flight plan requests a VFR climb/descent.

(2) *TERMINAL:* The clearance will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA-approved noise abatement route or altitude.

(3) *TERMINAL:* The pilot has requested a practice instrument approach and is not on an IFR flight plan.

Phraseology:
MAINTAIN VFR CONDITIONS.
MAINTAIN VFR CONDITIONS UNTIL (time or fix).
MAINTAIN VFR CONDITIONS ABOVE/BELOW (altitude).
CLIMB/DESCEND VFR;
and, if required,
BETWEEN (altitude) AND (altitude),
or
ABOVE/BELOW (altitude).

491.a.(3) Reference.—Practice Approaches, 435.

b. When, in your judgment, there is reason to believe that flight in VFR conditions may become impractical, issue an alternative clearance which will ensure separation from all other aircraft for which you have separation responsibility.

Phraseology:
IF UNABLE, (alternative procedure), AND ADVISE.

→492. VFR-ON-TOP

a. You may clear an aircraft to maintain "VFR-on-top" if the pilot of an aircraft on an IFR flight plan requests the clearance.

Phraseology:
MAINTAIN VFR-ON-TOP.

b. You may clear an aircraft to climb through clouds, smoke, haze, or other meteorological formations and then to maintain "VFR-on-top" if the following conditions are met:

(1) The pilot requests the clearance.

(2) You inform the pilot of the reported height of the tops of the meteorological formation, or

(3) You inform the pilot that no top report is available.

(4) When necessary, you ensure separation from all other traffic for which you have separation responsibility by issuing an alternative clearance.

(5) When an aircraft is climbing to and reports reaching "VFR-on-top," reclear the aircraft to maintain "VFR-on-top."

Phraseology:
CLIMB TO AND REPORT REACHING VFR-ON-TOP,
and
TOPS REPORTED (altitude),
or
NO TOPS REPORTS.
IF NOT ON TOP AT (altitude), MAINTAIN (altitude), and ADVISE.
MAINTAIN VFR-ON-TOP.

c. Do not clear an aircraft to maintain "VFR-on-top" between sunset and sunrise to separate holding aircraft from each other or from en route aircraft unless restrictions are applied to ensure the appropriate IFR vertical separation.

Phraseology:
MAINTAIN VFR-ON-TOP AT OR ABOVE/BELOW/BETWEEN (altitudes).

492.c. Examples.—"Maintain VFR-on-top at or above one three thousand five hundred."
"Maintain VFR-on-top at or below one two thousand five hundred."
"Maintain VFR-on-top at or between six thousand and one zero thousand."

d. When, in your judgment, there is reason to believe that flight in VFR conditions may become impractical, issue an alternative clearance which will ensure separation from all other aircraft for which you have separation responsibility.

Phraseology:
IF UNABLE, (alternative procedure), AND ADVISE.

e. If the aircraft's route, track, or altitude may cause it to enter an active Prohibited/Restricted/Warning Area, MOA, or ATCAA:

492.e. Reference.—Special Use and ATC Assigned Airspace, Chapter 7, Section 2.

(1) Inform the pilot to conduct flight "VFR-on-top" at least 500 feet (FL 290 and above—1,000 feet) above the upper limit or below the lower limit of the airspace (subject to **492.**); or

Phraseology:
MAINTAIN VFR-ON-TOP AT LEAST 500 FEET (FL 290 and above—1,000 FEET) ABOVE/BELOW (upper/lower limit of airspace) ACROSS (name or number of airspace) BETWEEN (fix) AND (fix); *and, if the airspace is an ATCAA,* (name of ATCAA) IS ATC ASSIGNED AIRSPACE.

(2) Clear the aircraft via a routing which provides approved separation from the airspace.

(3) *Exception.* Some Prohibited/ Restricted Areas are established for security reasons or to contain hazardous activities not involving aircraft operations. The addition of 500 (or 1,000) feet to the upper/ lower limit of these Prohibited/ Restricted Areas is not required if the areas have been identified by facility management.

491.a.(3) Reference.—Handbook 7210.3-214.

→493. ALTITUDE FOR DIRECTION OF FLIGHT

Inform an aircraft, maintaining "VFR-on-top," when a report indicates the pilot is not complying with FAR 91.109.

493. Note—As required by FAR 91.109, the appropriate VFR altitudes for aircraft (not in a holding pattern of 2 minutes or less, or turning) operating *more than 3,000 feet above the surface to and including FL 290:*

Magnetic courses 0–179—Odd cardinal altitudes plus 500 feet (e.g., 3,500, 5,500, FL 195, 275).

Magnetic courses 180–359—Even cardinal altitudes plus 500 feet (e.g., 4,500, 8,500, FL 205, 285).

Above FL 290:

Magnetic courses 0–179—4,000 foot intervals beginning with FL 300 (e.g., FL 300, 340, 380).

Magnetic courses 180–359—4,000 foot intervals beginning with FL 320 (e.g., 320, 360, 400).

Phraseology:

VFR-ON-TOP CRUISING LEVELS FOR YOUR DIRECTION OF FLIGHT ARE:

More than 3,000 feet above the surface to FL 290:

ODD/EVEN ALTITUDES/FLIGHT LEVELS PLUS FIVE HUNDRED FEET.

Above FL 290:

FOUR THOUSAND FOOT INTERVALS BEGINNING AT FLIGHT LEVEL THREE ZERO ZERO/THREE TWO ZERO.

494–599. RESERVED

624. RADAR BEACON CODE CHANGES

Unless otherwise specified in a Directive or a Letter of Agreement or coordinated at the time of handoff, do not request an aircraft to change from the code it was squawking in the transferring facility's area until the aircraft is within your area of responsibility.

625. FUNCTION CODE ASSIGNMENTS

Unless otherwise specified by a Directive or a Letter of Agreement, make nondiscrete code assignments from the following categories:

a. Assign codes to departing IFR aircraft as follows:

(1) Code 2000 to an aircraft which will climb to FL 240 or above, or to an aircraft which will climb to FL 180 or above where the base of PCA and the base of the operating sector are at FL 180, and for inter-facility handoff, the receiving sector is also stratified at FL 180. The en route code shall not be assigned until the aircraft is established in the high altitude sector.

(2) Code 1100 to an aircraft which will remain below FL 240 or below FL 180 as in (1) above.

(3) For handoffs from terminal facilities when so specified in a Letter of Agreement as follows:

(a) Within NBCAP airspace—Code 0100 to code 0400 inclusive, or any other code authorized by the Regional Air Traffic Division.

(b) Outside NBCAP airspace—Code 1000 or one of the codes from 0100 to 0700 inclusive, or any other code authorized by the Regional Air Traffic Division.

b. Assign codes to en route IFR aircraft as follows:

625.b. Note.—FL 180 may be used in lieu of FL 240 where the base of PCA and the base of the operating sector are at FL 180 and for inter-facility handoff, the receiving sector is also stratified at FL 180. The provisions of (2) (b) and (2) (c) may be modified by Facility Directive or Letter of Agreement when operational complexities or simplified sectorization indicate. Letters of Agreement are mandatory when the operating sectors of two facilities are not stratified at identical levels. The general concept of utilizing codes 2100 through 2500 within PCA should be adhered to.

(1) Aircraft operating below FL 240, or when control is transferred to a controller whose area includes the stratum involved.

(a) Code 1000 may be assigned to aircraft changing altitudes.

(b) Code 1100 to an aircraft operating at an assigned altitude below FL 240. Should an additional code be operationally desirable, code 1300 shall be assigned.

(2) Aircraft operating at or above FL 240, or when control is transferred to a controller whose area includes the stratum involved.

(a) Code 2300 may be assigned to aircraft changing altitudes.

(b) Code 2100 to an aircraft operating at an assigned altitude from FL 240 to FL 330 inclusive. Should an additional code be operationally desirable, code 2200 shall be assigned.

(c) Code 2400 to an aircraft operating at an assigned altitude from FL 350 to FL 600 inclusive. Should an additional code be operationally desirable, code 2500 shall be assigned.

(3) Code 4000—When aircraft are operating on a flight plan specifying frequent or rapid changes in assigned altitude in more than one stratum, or other conditions of flight not compatible with a stratified code assignment.

625.b.(3) Note 1.—Categories of flight that can be assigned code 4000 include certain flight test aircraft, MTR missions, aerial refueling operation requiring descent involving more than one stratum, ALTRVs where continuous monitoring of ATC communications facilities is not required and frequent altitude changes are approved, and other aircraft operating on flight plans requiring special handling by ATC.

→ **625.b.(3) Note 2.**—Military aircraft operating VFR or IFR in restricted/warning areas or VFR on VR routes will adjust their transponders to reply on code 4000 unless another code has been assigned by ATC or coordinated, if possible, with ATC.

c. Assign the following codes to arriving IFR aircraft, except military turbojet aircraft as specified in **433.**:

625.c. Note.—FL 180 may be used in lieu of FL 240 where the base of PCA and the base of the operating sector are at FL 180 and for inter-facility handoff, the receiving sector is also stratified at FL 180.

(1) Code 2300 may be assigned for descents while above FL 240.

(2) Code 1500 may be assigned for descents into and while within the strata below FL 240, or with prior coordination, the specific code utilized by the destination controller or the code currently assigned when descent clearance is issued.

(3) The applicable en route code for the holding altitude if holding is necessary before entering the terminal area and the appropriate code in (1) or (2).

626-629. RESERVED

630. VFR OPERATIONS

→ **a.** Provided the aircraft is within your area of responsibility or prior coordination has been effected with the facility/sector in whose area an aircraft is operating and an operational benefit will be gained, assign aircraft operating with a clearance specifying "VFR-on-top," "VFR conditions," or VFR aircraft receiving radar advisories an appropriate Function Code or computer-assigned code for the code environment in which you are providing service.

630.a. Note 1.—Paragraphs **621.**, **622.**, and **623.** specify code assignment procedures to follow for the three code environments.

630.a. Note 2.—Paragraphs **625.a.**, **b.**, and **c.**, specify Function Code allocation from which an appropriate code for the aircraft indicated in **630.a.** should be selected. In the terminal environment, additional Function Codes may be authorized by the Regional Air Traffic Division.

b. Instruct IFR aircraft which cancel an IFR flight plan and are not requesting radar advisory service and VFR aircraft for which radar advisory service is being terminated to squawk the VFR code.

Phraseology:

SQUAWK 1200.

630.b. Note.—VFR aircraft which fly authorized SAR missions for the USAF or USCG may be advised to squawk 1277 in lieu of 1200 while en route to/from or within the designated search area.

630.b. Reference.—FAA Order 7110.66A, National Beacon Code Allocation Plan.

631. EMERGENCY CODE ASSIGNMENT

Assign codes to emergency aircraft as follows:

a. Code 7700 when the pilot declares an emergency and the aircraft is not radar identified.

Phraseology:

SQUAWK MAYDAY ON 7700.

b. After radio and radar contact have been established, you may request other than single-piloted turbojet aircraft to change from code 7700 to another code appropriate for your radar beacon code environment.

631.b. Note 1.—The code change, based on pilot concurrence, the nature of the emergency, and current flight conditions will signify to other radar facilities that the aircraft in distress is identified and under ATC control.

631.b. Note 2.—Pilots of single-piloted turbojet aircraft may be unable to reposition transponder controls during the emergency.

Phraseology:

RADAR CONTACT. IF FEASIBLE, SQUAWK (code).

632. RADIO FAILURE

When you observe a code 7600 display, apply the procedures in **1603.**, Communications Failure.

632. Note.—Should a transponder equipped aircraft experience a loss of two-way radio communications capability, the pilot can be expected to adjust his transponder to code 7600.

633. STANDBY OR LOW SENSITIVITY OPERATION

You may instruct an aircraft operating on an assigned code to change transponder to "standby" or "low sensitivity" position:

633. Note.—National standards no longer require improved transponder to be equipped with the low sensitivity feature. Therefore, aircraft with late model transponders will be unable to respond to a request to "squawk low."

c. Observing a target make an identifying turn or turns of 30 degrees or more, provided the following conditions are met:

654.c. **Note.**—Use of identifying turns or headings which would cause the aircraft to follow normal IFR routes or known VFR flight paths might result in misidentification. When these circumstances cannot be avoided, additional methods of identification may be necessary.

(1) Except in the case of a lost aircraft, a pilot position report is received which assures you that the aircraft is within radar coverage and within the area being displayed.

(2) Only one aircraft is observed making these turns.

(3) For aircraft operating in accordance with an IFR clearance, you either issue a heading away from an area which will require an increased minimum IFR altitude or have the aircraft climb to the highest minimum altitude in your area of jurisdiction before you issue a heading.

655. BEACON IDENTIFICATION METHODS

When using only Mode 3/A radar beacon to identify a target, use one of the following methods:

a. Request the aircraft to activate the "IDENT" feature of the transponder and then observe the identification display.

655.a. **Note 1.**—At facilities where the single-slash 'IDENT' modification is installed or other decoder modifications have been made which increase the number of 'blooming' target displays, it will be necessary to exercise additional care to preclude the possibility of misidentification.

655.a. **Note 2.**—*TERMINAL:* When automated displays are operated in the analog mode, the "IDENT" return is displayed as a double slash and the emergency return as a single bloomer whenever the beacon control head is in the "FAIL" position.

Phraseology:
IDENT.
SQUAWK (code) AND IDENT.

b. Request the aircraft to change to a specific discrete or non-discrete code, as appropriate, and then observe the target or code display change. If a code change is required in accordance with Section 2 of this Chapter, use the codes specified therein.

c. Request the aircraft to change transponder to "standby." After you observe the target disappear for sufficient scans to assure that loss of target resulted from placing the transponder in "standby" position, request the aircraft to return transponder to normal operation and then observe the reappearance of the target.

Phraseology:
SQUAWK STANDBY,
then
SQUAWK (code).

→ **d.** *EN ROUTE:* During narrowband operations, an aircraft may be considered identified when the full data block is automatically associated with the beacon target symbol of an aircraft that is squawking a discrete code assigned by the computer.

Phraseology:
SQUAWK (4 digit discrete code), *and if aircraft has Mode C automatic altitude reporting and the equipment has been deactivated* AND ALTITUDE.

655.d. **Note.**—The AIM informs pilots to adjust Mode C transponders with altitude reporting capability activated unless deactivation is requested by ATC. SQUAWK ALTITUDE is included to provide applicable phraseology.

656. ARTS IDENTIFICATION METHODS

TERMINAL

a. Consider an auto-acquired aircraft as identified when its data block is displayed and is visible to you, not in coast, and one of the following conditions exist:

(1) Radar or beacon identification procedures have been used to confirm the identity of the tagged target.

→ (2) The aircraft is being handed off through use of NAS Stage A/ARTS or ARTS/ARTS automated handoff and "AM," "AMB," "TU," "NAT," "NB," or "CST" does not appear in the data block.

b. Use the ARTS data block to maintain target identity unless it is in a coast status or displaced from the appropriate target.

c. Displaced data block shall be updated at all times.

657-659. RESERVED

660. TARGET MARKERS

EN ROUTE

a. Use radar target markers (shrimp boats/data blocks) on horizontal scopes to provide continuous target identity. Post flight identification and altitude, when constant, on markers. Post miscellaneous items (abbreviated route, vector headings, arrows to indicate climb or descent, etc.) at your discretion. To prevent misinterpretation, use standard hand printed characters.

b. Automated Systems—Use data blocks that are associated with the appropriate target symbol to provide continuous identity. Display flight identification, interim altitude or assigned altitude if interim altitude is not being used, and reported altitude as minimum display. Interim/assigned altitude, reported altitude, or flight identification, or all may be temporarily inhibited in NAS En Route Stage A to eliminate an existing data block overlap condition.

661. QUESTIONABLE IDENTIFICATION

a. Use more than one method of identification when proximity of targets, duplication of observed action, or any other circumstances cause doubt as to target identification.

b. If identification is questionable for any reason, take immediate action to reidentify the aircraft or terminate radar service.

662. POSITION INFORMATION

Inform an aircraft of its position whenever radar identification is established by means of identifying turns or radar beacon procedures. Position information need not be given when identification is established by position correlation or when a departing aircraft is identified within 1 mile of the take-off runway end.

663. DEVIATION ADVISORIES

Inform an aircraft when it is observed in a position and on a track which will obviously cause the aircraft to deviate from its protected airspace area. If necessary, assist the aircraft to return to the assigned protected airspace.

664. POSITION REPORTING

a. If necessary, you may request an aircraft to provide an estimate or report over a specific fix.

664.a. Note.—After an aircraft receives the statement "radar contact" from ATC, it discontinues reporting over compulsory reporting points. It resumes normal position reporting when ATC informs it "radar contact lost" or "radar service terminated."

664.a. Reference.—Glossary (Radar Contact).

b. When required, inform an aircraft of its position with respect to a fix or airway.

Phraseology:

OVER/PASSING (fix).

(Number of miles) MILES FROM (fix).

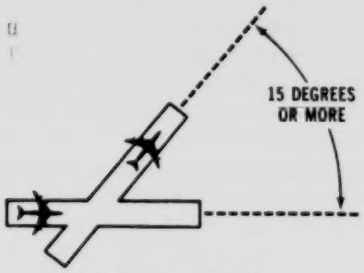
(Number of miles) MILES (direction) OF (fix, airway, or location).

CROSSING/JOINING/DEPARTING (airway or route).

INTERCEPTING/CROSSING (name of NAVAID) (specified) RADIAL.

665-679. RESERVED

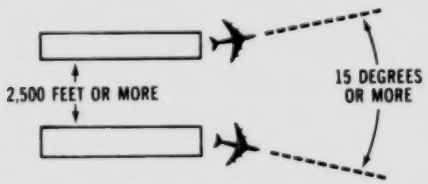
(2) Intersecting runways which diverge by 15 degrees or more—Authorize takeoff of a succeeding aircraft when the preceding aircraft has passed the point of runways intersection. When applicable, apply the procedure in **1112.**



742.b.(2) Illustration

742.b.(2) **Note.**—This procedure does not apply when aircraft are departing behind a heavy jet.

c. Between aircraft departing in the same direction from parallel runways—Authorize simultaneous takeoffs if the centerlines are separated by at least 2,500 feet and courses diverge immediately after departure.



742.c. Illustration

743. DEPARTURE AND ARRIVAL

TERMINAL

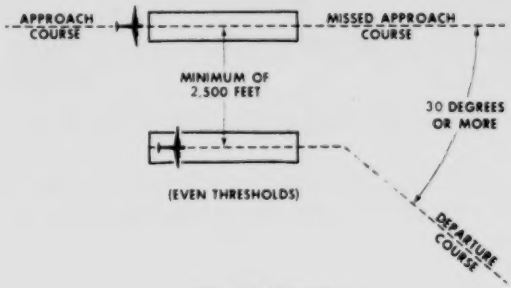
Except as provided in **744.**, separate a departing aircraft from an arriving aircraft on final approach by a minimum of *2 miles* if separation will increase to a minimum of *3 miles* (*5 miles* when 40 miles or more from the antenna) within 1 minute after takeoff.

744. DEPARTURES AND ARRIVALS ON PARALLEL OR NONINTERSECTING DIVERGING RUNWAYS

TERMINAL

Authorize simultaneous operations between an aircraft departing on a runway and an aircraft on final approach to another parallel or nonintersecting diverging runway if the departure course diverges immediately by at least 30 degrees from the missed approach course until separation is applied and provided one of the following conditions are met:

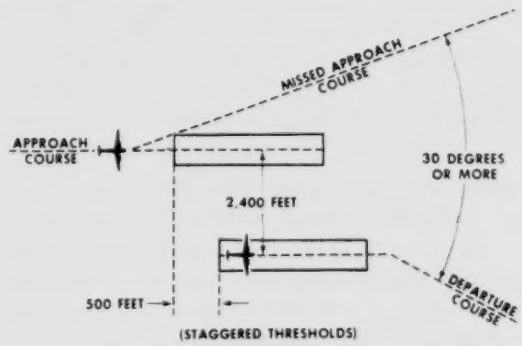
a. When parallel runway thresholds are even, the runway centerlines are at least 2,500 feet apart.



744.a. Illustration

b. When parallel runway thresholds are staggered and:

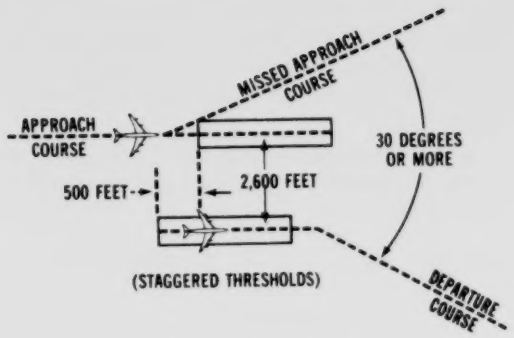
(1) The arriving aircraft is approaching the nearer runway—The centerlines are at least 1,000 feet apart and the landing thresholds are staggered at least 500 feet for each 100 feet less than 2,500 the centerlines are separated.



744.b.(1) Illustration

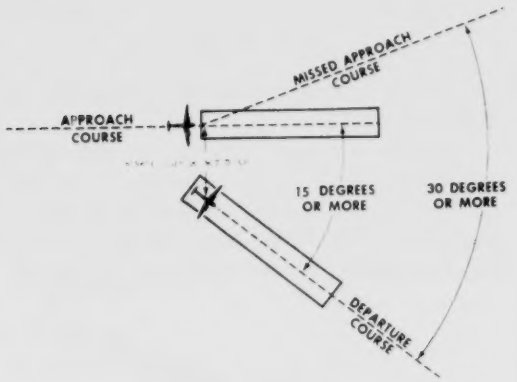
744.b.(1) **Note.**—In the event of a missed approach by a heavy jet, apply the procedures in **1404** or ensure that the heavy jet does not overtake an aircraft departing from the adjacent parallel runway.

(2) The arriving aircraft is approaching the farther runway—The runway centerline separations exceeds 2,500 feet by at least 100 feet for each 500 feet the landing thresholds are staggered.



744.b.(2) Illustration

c. When nonintersecting runways diverge by 15 degrees or more and runway edges do not touch.



744.c. Illustration

→ 745. ADDITIONAL SEPARATION FOR FORMATION FLIGHTS

Because of the distance allowed between formation aircraft and lead aircraft, additional separation is necessary to ensure the periphery of the formation is adequately separated from other aircraft, adjacent airspace, or obstructions. Provide supplemental separation for formation flights as follows:

a. Separate a standard formation flight by adding *1 mile* to the appropriate radar separation minima.

b. Separate two standard formation flights from each other by adding *2 miles* to the appropriate separation minima.

c. Separate a nonstandard formation flight by applying the appropriate separation minima to the perimeter of the airspace encompassing the nonstandard formation or from the outermost aircraft of the nonstandard formation, whichever applies.

d. If necessary for separation between a nonstandard formation and other aircraft, assign an appropriate beacon code to each aircraft in the formation or to the first and last aircraft in-trail.

745. Note—Appropriate separation is that prescribed in this section (Chapter 4, Section 7), in Chapter 5, Section 21 (Stage III), and in Chapter 6, Section 2, when applicable. The additional separation provided in **745.** is not normally added to wake turbulence separation when a formation is following a heavier aircraft since none of the formation aircraft are likely to be closer to the heavier aircraft than the lead aircraft (to which the prescribed wake turbulence separation has been applied).

745.a. Reference.—Formation Flights, 27; Application, 740; Separation, 1282. Glossary (Formation Flight)

746-749. RESERVED

750. ADJACENT AIRSPACE

a. If coordination between the controllers concerned has not been effected, separate radar-controlled aircraft from the boundary of adjacent airspace in which radar separation is also being used by the following minima:

750.a. Reference.—Coordinate Use of Airspace, 34.

(1) When less than 40 miles from the antenna—*1½ miles.*

(2) When 40 miles or more from the antenna—*2½ miles.*

(3) *EN ROUTE* Stage A:

(a) Below Flight Level 600—*2½ miles.*

(b) Flight Level 600 and above—*5 miles.*

b. Separate radar-controlled aircraft from the boundary of airspace in which nonradar separation is being used by the following minima:

(1) When less than 40 miles from the antenna—*3 miles.*

(2) When 40 miles or more from the antenna—*5 miles.*

(3) *EN ROUTE* Stage A—

(a) Below Flight Level 600—*5 miles.*

(b) Flight Level 600 and above—*10 miles.*

c. Separate nonparticipating radar-controlled aircraft from the peripheral boundary of active special use airspace and ATCAA by the following minima:

750.c. Reference.—Special Use and ATC Assigned Airspace, Chapter 7, Section 2.

(1) Prohibited/Restricted/Warning Area, MOA, or ATCAA—*3-miles* (En Route Stage A, FL 600 and above—*6-miles*), unless clearance of nonparticipating aircraft in/through/adjacent the area is provided for in a Letter of Agreement/Facility Directive.

(2) *Exception.* Some Prohibited/Restricted Areas are established for security reasons or to contain hazardous activities not involving aircraft operations. The above minima for these Prohibited/Restricted Areas is not required if the areas have been identified by facility management. When the separation minima is not required, vector aircraft to avoid the airspace.

750.c.(2) Reference.—Handbook 7210.3—214.

751. EDGE OF SCOPE

Separate a radar-controlled aircraft climbing or descending through the altitude of an aircraft that has been tracked to the edge of the scope/display by the following minima until nonradar separation has been established:

a. When less than 40 miles from the antenna—*3 miles* from edge of scope.

b. When 40 miles or more from the antenna—*5 miles* from edge of scope.

c. *EN ROUTE* Stage A—

(1) Below Flight Level 600—*5 miles.*

(2) Flight Level 600 and above—*10 miles.*

752-754. RESERVED

755. BEACON TARGET DISPLACEMENT

When using a radar target display with a previously specified beacon target displacement to separate a beacon target from a primary target, adjacent airspace, obstructions, or terrain add a *1 mile* correction factor to the applicable minima.

755. Note.—The maximum allowable beacon target displacement which may be specified by the facility chief is ½ mile.

755. Reference.—7210.3—373, Monitoring of Mode 3/A Radar Beacon Codes.

756. GPA 102/103 CORRECTION FACTOR

When using a radar display whose primary radar video is processed by the GPA 102/103 modification to a joint-use radar system, apply the following correction factors to the applicable minima:

a. If less than 40 miles from the antenna—add *1 mile.*

b. If 40 miles or more, but not over 200 miles, from the antenna—add *3 miles.*

757. SEPARATION FROM OBSTRUCTIONS

a. Except in NAS En Route Stage A, separate aircraft from prominent obstructions depicted on the radar scope (displayed on the video/geo map, scribed on the map overlay, or displayed as a permanent echo) by:

(1) A minimum of *3 miles* within 40 miles of a radar antenna.

(2) A minimum of *5 miles* beyond 40 miles of a radar antenna.

b. Except in NAS En Route Stage A, vertical separation of aircraft above a prominent obstruction displayed as a permanent echo may be discontinued after the aircraft passed it.

c. *NAS EN ROUTE STAGE A:* Apply the radar separation minima specified in **740.b.**(1) (a).

757.a., b., and c. Note.—The determination of what constitutes a prominent obstruction is made locally after coordination with appropriate Flight Standards representatives.

758-769. RESERVED

Section 8. RADAR DEPARTURES

770. PROCEDURES

Use standard departure routes and channelized altitudes whenever practical to reduce coordination. Do not, however, assign these routes solely to provide for possible radar or communication failure.

771. INITIAL HEADING

Before departure, assign the initial heading to be flown if a departing aircraft is to be vectored immediately after takeoff.

Phraseology:

FLY RUNWAY HEADING.

TURN LEFT/RIGHT, HEADING (degrees).

771. **Note.**—*TERMINAL:* A purpose for the heading is not necessary, since pilots operating in a radar environment associate assigned headings with vectors to their planned route of flight.

771. **Reference.**—Clearances, 350.

772. CODE ASSIGNMENT

TERMINAL

Assign the appropriate mode/code and, if necessary, a low sensitivity setting before takeoff if a beacon reply is required immediately after takeoff. This assignment should be made on the clearance delivery or ground control frequency.

Phraseology:

DEPARTURE FREQUENCY WILL BE (frequency), SQUAWK (code), *and if required,* LOW.

772. **Note 1.**—National standards no longer require improved transponders to be equipped with the low sensitivity feature. Aircraft with late model transponders will be unable to "squawk low."

772. **Note 2.**—Pilots are advised in AIM that transponders should be turned to NORMAL or ON as late as practicable prior to takeoff.

773. VECTORS BELOW MINIMUM ALTITUDE

Except in En Route automated environments in areas where more than *3 miles* separation minima is required, you may vector a departing IFR aircraft, or one executing a missed approach, within 40 miles of the antenna and before it reaches the minimum altitude for IFR operations if separation from prominent obstructions shown on the radar scope is applied in accordance with the following:

a. If the flight path is 3 miles or more from the obstruction and the aircraft is climbing to an altitude at least 1,000 feet above the obstruction, vector the aircraft to maintain at least *3* miles separation from the obstruction until the aircraft reports leaving an altitude above the obstruction.

b. If the flight path is less than 3 miles from the obstruction, and the aircraft is climbing to an altitude at least 1,000 feet above the obstruction, vector the aircraft to increase lateral separation from the obstruction until the *3 mile* minimum is achieved or until the aircraft reports leaving an altitude above the obstruction.

774-789. RESERVED

Section 10. SPEED ADJUSTMENT

→820. APPLICATION

a. Do not request speed adjustment of aircraft:

(1) At or above FL 290 without pilot consent.

(2) Executing a published high altitude instrument approach procedure.

(3) In a holding pattern.

(4) Cleared for approach, except that when action is necessary to maintain or achieve desired or required spacing and application of these procedures is preferable to S-turns or discontinuance of approach. If required, previously issued speed adjustments shall be restated if that speed is to be maintained or additional speed adjustments requested until the aircraft reaches the final approach fix or a point 5 miles from the runway, whichever is farther from the runway.

820.a.(4) Note.—Approach clearances supersede any prior speed adjustment assignments. Pilots are expected to make their own speed adjustment to complete the approach unless the controller has requested a speed adjustment. Controllers are expected to keep speed adjustments in this area to the minimum required to achieve or maintain required or desired spacing and to permit pilots to resume normal speed when this objective is achieved. It is the pilot's responsibility and prerogative to refuse speed adjustment that he considers excessive or contrary to the aircraft's operating specifications.

b. Express all speed adjustments in terms of knots based on indicated airspeed (IAS) in 10 knot increments, except that at or above FL 240 speeds may be expressed in terms of mach numbers in 0.01 increments for turbojet aircraft with mach meters (i.e., mach 0.69, 0.70, 0.71, etc.).

820.b. Note.—Pilots complying with speed adjustment requests should maintain a speed within plus or minus 10 knots or 0.02 mach number of the specified speed.

c. Use mach numbers only to establish or maintain longitudinal separation between aircraft at the same altitude.

→821. METHODS

a. Request aircraft to:

(1) Maintain present speed.

(2) Increase or reduce to a specified speed or by a specified number of knots.

(3) Avoid exceeding a specified speed.

Phraseology:

SAY AIRSPEED. SAY MACH NUMBER. INCREASE/REDUCE SPEED: TO (specified speed in knots), *or* TO MACH (mach number), *or* (number of knots) KNOTS. DO NOT EXCEED (speed) KNOTS, *or* MACH (mach number).

821.a. Examples.—"Increase speed to mach point seven two." "Reduce speed to two five zero." "Reduce speed two zero knots." "Do not exceed mach point seven four."

(4) Only if the pilot concurs, reduce to a specified speed or amount less than the minimum speeds in **822**.

Phraseology:

IF PRACTICAL, REDUCE SPEED: TO (specified speed in knots), *or* TO MACH (mach number), *or* (number of knots) KNOTS.

821.a. Note.—A pilot operating above 10,000 feet MSL on an assigned speed adjustment greater than 250 knots is expected to comply with FAR 91.70(a) when cleared below 10,000 feet MSL without notifying ATC. Pilots are expected to comply with the other provisions of FAR 91.70 without notification unless otherwise authorized by ATC.

b. Specify which action is expected first when combining speed reduction with a descent clearance.

(1) Speed reductions prior to descent.

Phraseology:

REDUCE SPEED: TO (specified speed), *or* (number of knots) KNOTS. THEN, DESCEND AND MAINTAIN (altitude).

(2) Speed reduction following descent.

Phraseology:

DESCEND AND MAINTAIN (altitude). THEN, REDUCE SPEED: TO (specified speed in knots), *or* TO MACH (mach number), *or* (number of knots) KNOTS.

821.b. Note 1.—Simultaneous speed reduction and descent can be extremely difficult, particularly for turbojet aircraft. Specifying which action is to be accomplished first removes any doubt the pilot may have as to controller intent or priority.

821.b. Note 2.—When specifying descent prior to speed reduction, consider the maximum speed requirements specified in FAR 91.70. It may be necessary for the pilot to level off temporarily and reduce speed prior to descending below 10,000 feet MSL.

c. Specify combined speed/altitude fix-crossing restrictions.

Phraseology;

CROSS (fix) AT AND MAINTAIN (altitude) AT (specified speed) KNOTS.

821.c. Example.—

"Cross Robinsville at and maintain six thousand at two three zero knots."

→ 822. MINIMA

Unless a pilot concurs in the use of a lower speed, use the following minima:

a. To aircraft operating between FL 280 and 10,000 feet, a speed not less than 250 knots or the equivalent mach number.

822.a. Note—On a standard day the mach numbers equivalent to 250 knots CAS (subject to minor variations) are: FL 240—0.6; FL 250—0.61; FL 260—0.62; FL 270—0.64; FL 280—0.65; FL 290—0.66.

b. To arrival aircraft operating below 10,000 feet:

(1) Turbine powered aircraft—A speed not less than 210 knots; *except* when the aircraft is within 20 flying miles of the runway threshold of the airport of intended landing, a speed not less than 170 knots.

(2) Reciprocating engine aircraft—A speed not less than 150 knots when the aircraft is within 20 flying miles of the runway threshold of the airport of intended landing.

c. Departures:

(1) Turbine powered aircraft—A speed not less than 230 knots.

(2) Reciprocating engine aircraft—A speed not less than 150 knots.

823. LIMITATIONS

Accomplish speed adjustment to aircraft which cannot attain the minimum speeds set forth in **822.** by requesting such flights to, if practical:

a. Maintain a specified speed equivalent to that of the preceding or succeeding aircraft, or

b. Increase or decrease speed utilizing increments of 10 knots or multiples thereof.

Phraseology:

IF PRACTICAL, MAINTAIN (specific speed)

or

IF PRACTICAL, INCREASE/REDUCE SPEED (specified knots) KNOTS.

824. TERMINATION

Advise aircraft when speed adjustment is no longer needed.

Phraseology:

RESUME NORMAL SPEED.

825-839. RESERVED

Section 5. TAXI AND GROUND MOVEMENT PROCEDURES

970. TRAFFIC MOVEMENT

Issue by radio or directional light signals specific instructions, approval, or disapproval for the movement of aircraft, vehicles, equipment, or personnel on the movement area. Do not issue conditional taxi instructions that are dependent upon the movement of an arrival aircraft on or approaching the runway or a departure aircraft established on a take-off roll, e.g., do *not* say, "Taxi into position and hold behind landing traffic," or "Taxi across Runway Three Six behind departing/landing Jetstar."

971. USE OF ACTIVE RUNWAYS

For ATC purposes, the local controller has primary responsibility for operations on the active runway and must control the use of those runways. Positive coordination and control are required as follows:

971. Note.—Exceptions may be authorized only as provided in paragraph 11. and 7210.3—1205 where justified by extraordinary circumstances at specific locations (see 7210.3—1205.b.).

a. Ground control must obtain approval from local control before authorizing an aircraft or vehicle to cross or use any portion of an active runway.

b. Aircraft may be authorized to taxi along an active runway by local control, via direct communications on the control frequency, or by ground control after coordination with local control is completed.

c. The local controller shall coordinate with the ground controller before using a runway not previously designated as active.

971.c. Reference.—7210.3—1204, Selecting Active Runways.

972. TAXI INFORMATION

When taxi information is required, issue the following, as appropriate, in concise and easy to understand terms:

a. Route for the aircraft to follow on the movement area.

972.a. Note.—Movement of aircraft within loading, maintenance, or parking areas is the responsibility of the pilot, aircraft operator, or airport management.

Phraseology:

TAXI: VIA (route) *or* ON (runway number or taxiway, etc.) *or* TO (location) *or* (direction) *or* ACROSS RUNWAY (runway number).

CONTINUE TAXIING: VIA (route) *or* ON (runway number or taxiway, etc.) *or* (direction).

972.a. Examples.—

"Turn right at first intersection." "Taxi straight ahead to end of runway, then turn left."

b. Instructions to hold and traffic information as necessary.

972.b. Note.—When authorizing an aircraft to "taxi to" an assigned takeoff runway, the absence of holding instructions authorizes the aircraft to "cross" all runways which the taxi route intersects except the assigned takeoff runway. It does not include authorization to "taxi onto" or "cross" the assigned takeoff runway at any point. In absence of holding instructions, a clearance to "taxi to" any point other than an assigned takeoff runway, is a clearance to cross all taxiways and runways that intersect the taxi route to that point.

Phraseology:

HOLD: SHORT OF (location), *or* ON (taxi strip, run-up pad, etc.), *and if necessary* TRAFFIC (traffic information), *or* FOR (reason).

c. Instructions to expedite a taxiing aircraft.

Phraseology:

TAXI WITHOUT DELAY (traffic if necessary).

→973. RUNWAY PROXIMITY

Hold a taxiing aircraft clear of a runway as follows:

a. At established holding points marked by taxiway hold lines/signs.

b. If no hold lines/signs are established, instruct aircraft to hold short of a specific runway.

c. Issue traffic information as necessary.

973. Note—Establishing hold lines/signs are the responsibility of the airport manager. Standards for accomplishing this are contained in Advisory Circulars 150/5340-1E and 150/5340-18A. Information on taxiway markings is published in the AIM.

973. Reference.—Taxi Information, 972; Altitude Restricted Low Approach, 1102.

974. ILS PROTECTION/CRITICAL AREAS

USAF NOT APPLICABLE

If an ILS critical area is marked and identifiable, restrict aircraft and surface vehicle operations, and provide information as follows when the ILS is being used for approach/landing guidance.

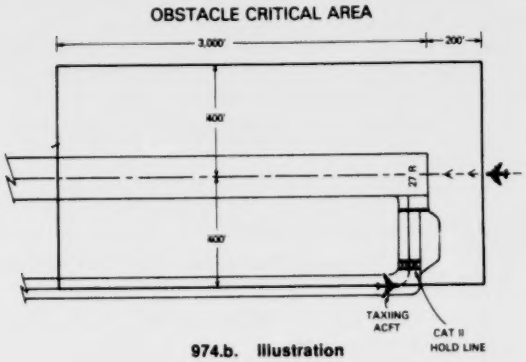
974. Note.—Restrictions to the operation of aircraft and vehicles are required to assure integrity of ILS course signals and to meet obstacle clearance needs. Airport operators are responsible for installing and maintaining appropriate signs and markings delineating taxi lanes, hold lines, and no parking areas associated with ILS critical areas.

a. Holding—When conditions are less than reported ceiling 800 feet and/or visibility 2 miles, do not authorize aircraft to hold below 5,000 feet inbound toward the airport on or within 1 statute mile of the localizer between the ILS FAF and the airport.

974.a. Reference.—Handbook 7130.3, paragraph 54, and Figure 20.

b. Obstacle Critical Area—When conditions are reported ceiling less than 200 feet and/or RVR 2,000 or less, do not authorize vehicles/aircraft to be in the area when an aircraft conducting an approach/missed approach enters/is over the area.

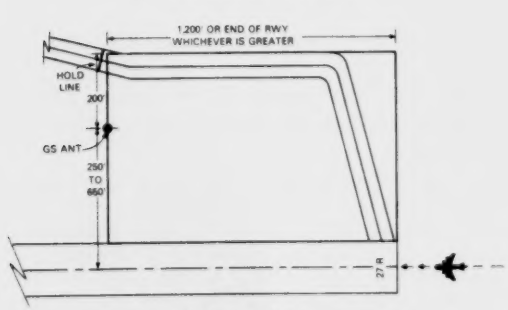
OBSTACLE CRITICAL AREA



974.b. Illustration

c. Glide Slope Critical Area—When conditions are less than reported ceiling 800 feet and/or visibility 2 miles, do not authorize vehicles/aircraft to operate in the area when an arriving aircraft is inside the ILS FAF unless that aircraft has reported the airport in sight and is circling/sidestepping to land on other than the ILS runway.

GLIDE SLOPE CRITICAL AREA



974.c. Illustration

d. Localizer Critical Area—

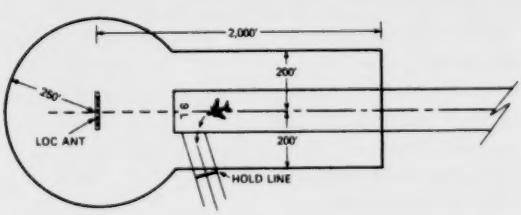
(1) When conditions are less than reported ceiling 800 feet and/or visibility 2 miles, do not authorize vehicle or aircraft operations in or over the area when an arriving aircraft is between the ILS FAF and the airport, except:

(a) A preceding arriving aircraft on the same or another runway that passes over or through the area while landing or exiting the runway.

(b) A preceding departing aircraft or missed approach on the same or another runway that passes through or over the area.

(2) In addition to (1) above, when conditions are reported ceiling less than 200 feet and/or RVR 2,000 or less, do not authorize vehicle or aircraft operations in or over the area when an arriving aircraft is inside the ILS MM.

LOCALIZER CRITICAL AREA



974.d. Illustration

e. Glide Slope/Localizer Critical Area Advisories—When conditions are such that vehicle/aircraft restrictions in/over the areas are not required and an arriving aircraft advises the tower it will operate "Coupled" or "Autoland," or uses a similar phrase, promptly issue an advisory if a vehicle/aircraft will be in/over an area when the arriving aircraft is inside the ILS MM.

Phraseology:

LOCALIZER/GLIDE SLOPE SIGNAL NOT PROTECTED.

975-979. RESERVED

(3) It is determined that the lights are of no further use to the pilot.

b. As required by Facility Directives to meet local conditions.

c. As requested by the pilot.

1065. VISUAL APPROACH SLOPE INDICATORS (VASI)

VASI systems with remote on-off switching shall be operated when they serve the runway in use and where intensities are controlled in accordance with the **Tables**, except:

a. As required by Facility Directives to meet local conditions.

b. As required by the pilot.

1065. Table 1.—VASI Intensity Setting Two Step System.

Step	*Period/Condition*
High	Day—Sunrise to sunset.
Low	Night—Sunset to sunrise.

1065. Table 2.—VASI Intensity Setting—Three Step System.

Step	*Period/Condition*
High	Day—Sunrise to sunset.
Medium	Twilight—From sunset to 30 minutes after sunset and from 30 minutes before sunrise to sunrise, and during twilight in Alaska.
	Note—During a 1 year period, twilight may vary 26 to 43 minutes between 25 and 49N latitude.
Low	Night—From 30 minutes after sunset to 30 minutes before sunrise.

1065. Note.—The basic FAA standard for VASI systems permits independent operation by means of photoelectric device. This system has no on-off control feature and is intended for continuous operation. Other VASI systems in use include those that are operated remotely from the control tower. These systems may consist of either a photoelectric intensity control with only an on-off switch, a two step intensity system, or a three step intensity system.

1065. Reference.—7210.3-1254, VASI Systems. Handbook 6850.2, Visual Guidance Lighting Systems.

1066-1079. RESERVED

Section 9. RUNWAY VISIBILITY

1080. FURNISH RVR/RVV VALUES

Where RVR or RVV equipment is operational, irrespective of subsequent operation or non-operation of navigational or visual aids for the application of RVR/RVV as a takeoff or landing minima, furnish the values for the runway in use in accordance with **1082.**

→ **1080. Note.**—Readout capability of different type/model RVR equipment varies. For example, older equipment minimum readout value is 600 feet. Newer equipment may have minimum readout capability as low as 100 feet. Readout value increments also may differ. Older equipment has minimum readout increments of 200 feet. New equipment increments below 800 feet are 100 feet.

1080. References.—Order 6560.10, Runway Visual Range (RVR). Order 6750.24, ILS Electronic Requirements.

1081. ARRIVAL/DEPARTURE RUNWAY VISIBILITY

a. Issue current touchdown RVR/RVV for the runway/s in use:

(1) When prevailing visibility is 1 mile or less regardless of the value indicated.

(2) When RVR/RVV indicates a reportable value regardless of the prevailing visibility.

1081.a.(2) Note.—Reportable values are: RVR 6,000 feet or less; RVV 1½ miles or less.

b. Issue mid/rollout RVR when the value of either is less than 2,000 feet and less than the touchdown value.

1082. TERMINOLOGY

a. Provide RVR/RVV information by stating the runway, the abbreviations RVR/RVV, and the indicated value. When issued along with other weather elements, transmit these values in the normal sequence used for weather reporting.

1082.a. Example.—

"Runway One Four R-V-R two thousand four hundred."

"Runway Three Two R-V-V three quarters."

b. When two or more RVR systems serve the runway in use, report the indicated values for the different systems in terms of touchdown, mid and rollout as appropriate.

1082.b. Example.—

"Runway Two Two Left R-V-R two thousand, rollout one thousand eight hundred."

"Runway Two Seven Right R-V-R one thousand, mid eight hundred, rollout six hundred."

c. When there is a requirement to issue an RVR or RVV value and a visibility condition greater or less than the reportable values of the equipment is indicated, state the condition as MORE than or LESS than the appropriate minimum or maximum readable value.

1082.c. Example.—

"Runway Three Six R-V-R more than six thousand."

"Runway Niner R-V-R one thousand, rollout less than six hundred."

d. When a readout indicates a rapidly varying visibility condition (1,000 feet or more for RVR; one or more reportable values for RVV), report the current value followed by the range of visibility variance.

1082.d. Example.—

"Runway Two Four R-V-R two thousand, variable one thousand six hundred to three thousand."

"Runway Three One R-V-V three-quarters, variable one-quarter to one."

1083-1099. RESERVED

Section 4. SPECIAL INTEREST FLIGHTS

→ 1480. GENERAL

EN ROUTE

a. All flight movement data on the aircraft listed in (1) and (2) below shall be immediately brought to the attention of the Assistant Chief and forwarded by the most expeditious means (voice, if possible) to the Senior Director at the concerned NORAD Region Control Center and to the Central Flow Control Function of the ATCCC (AAT-440). Voice messages will be followed up with a teletypewriter message when directed. All flight plans on aircraft listed in (1) and (2) below, including flights within the Continental U.S., shall be retransmitted by teletypewriter to AAT-440 and the Office of International Aviation Affairs, Attention: AIA-132.

1480.a. Note 1.—All flight movement data includes flight plans and changes thereto such as changes from IFR to VFR, reroutes or route deviations authorized or directed by the facility, departure messages, arrival messages, unauthorized route deviations or any other unusual operations, etc.

1480.a. Note 2.—These procedures are in addition to the AMIS procedures contained in Handbook 7610.4, Part 2.

1480.a. Note 3.—Communist-controlled countries include Albania, Bulgaria, Cambodia, Peoples Republic of China, Cuba, Czechoslovakia, East Germany, Hungary, North Korea, Outer Mongolia, Poland, Romania, the Union of Soviet Socialist Republics and Socialist Republic of Vietnam.

1480.a. Note 4.—The concerned NORAD Region is the one to whom SCATANA reports are forwarded consistent with local ARTCC/NORAD Region SCATANA reporting procedures.

1480.a. Note 5.—All Continental U.S. facilities have either direct flow control interphone circuits or can reach AAT-440 by Autovon (851-3430) or telephone number (202) 426-3797.

(1) All known aircraft of Cuban registry and all known civil aircraft of other Communist-controlled countries that will enter, overfly, or operate within the Continental United States, the Atlantic, Gulf of Mexico or Pacific Coastal ADIZs or the Southern Border Domestic ADIZ.

1480.a.(1) Reference.—Glossary (Continental United States).

(2) All known civil aircraft of foreign registry (other than the aircraft in (1) above) that will enter or overfly the Continental United States en route to or from Cuba.

b. Advance route information which has been cleared by NORAD and coordinated by AIA-132 with the State Department, as necessary, will be passed to the concerned ARTCCs by AIA-132 via AAT-440. Inform AAT-440 of your concurrence or problems with the route, as the case may be. AAT-440 will relay any problems to AIA-132 for resolution with NORAD. Advance route information does not constitute the forwarding of flight movement data to NORAD as specified in **a.** above.

1481. APPLICATION

EN ROUTE

a. Comply with any operational request that may be received directly from NORAD or through AAT-370 unless the change will affect flight safety. When safety is a factor, acquaint NORAD with the situation and attempt to work out an alternate solution if time and circumstances permit. If unable, take the course of action dictated by flight safety considerations and inform NORAD and AAT-440 as quickly as possible thereafter. Comply with requests for information or assistance from NORAD or the State Department which may include relay of messages to facilities or an aircraft in flight.

1481.a. Note.—State Department communications will be relayed through AAT-440.

b. Request the aircraft to return to its approved route/reroute of flight whenever any deviation is noted.

c. Immediately alert the Assistant Chief and notify the Senior Director at the concerned NORAD Region Control Center and AAT-440 via the most expeditious means when the following conditions occur:

(1) The aircraft refuses to comply with a NORAD or State Department message.

(2) Communication with the aircraft is established but the aircraft's identification cannot be immediately correlated with a known flight plan. Attempt flight plan correlation when time permits.

(3) The aircraft deviates from its approved route of flight and refuses to return to it when so requested.

(4) The aircraft refuses a reroute when so cleared or deviates from its reroute and refuses to return to it when requested.

(5) A departure message on a flight plan of an aircraft in **1480.a.**(1), originating in Canada, Mexico, or Cuba is not received within 5 minutes after the proposed time and you are unable to ascertain if the aircraft has departed either IFR or VFR.

d. If NORAD dispatches aircraft to intercept and escort the flight, the control procedures in 7610.4, Part 6 shall apply.

→1482. EMERGENCY OR UNSCHEDULED LANDINGS

a. If an aircraft of a communist-controlled country makes an emergency or unscheduled landing in the United States, immediately alert the AC/controller-in-charge of the shift and notify:

(1) *EN ROUTE:* In the Continental United States—

(a) The Senior Director at the concerned NORAD Region Control Center.

(b) AAT-440.

1482.a. Note.—AAT-440 will relay or voice-patch the information to all FAA Washington Headquarters organizations concerned.

(c) U.S. Customs Service Office for the airport where the aircraft will land.

(2) *EN ROUTE:* In the Pacific Region, Puerto Rico, and the Virgin Islands—The Air Defense Control Center and the offices specified in **a.**(1) (b) and **a.**(1) (c).

1482.a.(2) Note.—Guam CERAP forwards the information through the Honolulu ARTCC.

(3) *EN ROUTE:* In the Alaskan Region—The Alaskan NORAD Region Control Center and the offices specified in **a.**(1)(b) and **a.**(1)(c).

(4) *TERMINAL:* The nearest U.S. Customs Service Office and the appropriate ARTCC.

b. Provide the following information to the organizations specified in **a.**(1), (2), (3), and (4) above if available:

(1) Type of aircraft.

(2) Country of aircraft registry.

(3) Destination airport.

(4) Nature of emergency or reason for landing, as appropriate.

c. Advise the pilot that passengers must remain aboard the aircraft after landing until cleared by the U.S. Customs Service Office.

d. *TERMINAL:* In cases where communication is established with the aircraft but the aircraft identification cannot be immediately correlated with a known flight plan, notify the appropriate ARTCC and nearest U.S. Customs Service Office.

1483-1489. RESERVED

Section 2. IFR OPERATIONS

1710. LONGITUDINAL SEPARATION

a. Separate aircraft at any altitude using DME by a minimum of *20 miles* except that *10 miles* may be used when the leading aircraft maintains a speed at least 40 knots faster than the succeeding aircraft.

1710.a. Reference.—Minima on Same, Converging, or Crossing Courses, 271.

b. Separate aircraft above FL 230 by *5 minutes* when the leading aircraft maintains a speed at least 40 knots faster than the following aircraft and one of the conditions listed in **271.b.**(1), (2) or (3) exists.

1710.b. Reference.—Minima on Same, Converging or Crossing Courses, 271.

c. Provide vertical separation to opposite direction aircraft at FL 230 and below until both aircraft have reported passing the same radial or LFR course, provided the radial or course is crossed at an angle of a least 45 degrees and the aircraft:

(1) Are at least 2 minutes apart when within 25 miles of the NAVAID producing the radial or LFR course.

(2) Are at least 4 minutes apart when beyond 25 miles of the NAVAID producing the radial or LFR course.

1710.c.(2) Reference.—Minima on Opposite Courses, 272.

d. Provide vertical separation to opposite direction aircraft above FL 230 until both aircraft have reported the same NAVAID, radial, or LFR course, provided the radial or course is crossed at an angle of at least 45 degrees and the aircraft are at least 2 minutes apart.

1710.d. Reference.—Minima on Opposite Courses, 272.

e. When reports indicate that opposite direction aircraft using DME have passed, you may clear an aircraft to climb or descend when position reports indicate *5-mile* separation exists provided the outbound aircraft is 15 miles or more from the DME NAVAID.

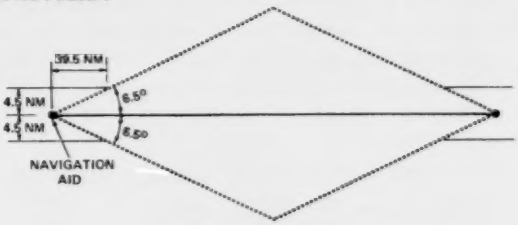
1710.e. Reference.—Minima on Opposite Courses, 272.

1711. LATERAL SEPARATION

Protect airspace along high level airways, routes, direct courses, and course changes 15 degrees or less:

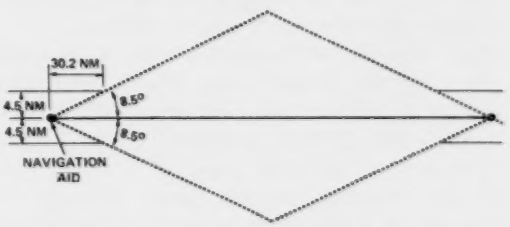
1711. Reference.—Separation Methods, 280; Minima Along Other Than Established Airways or Routes, 281.

a. On high level airways formed by VOR radials and direct courses between VORs at any altitude; high level airways and routes and direct courses at FL 230 and below formed by non-directional radio beacons, low frequency range courses or a combination of one of these and a VOR radial—*4.5 miles* on each side of the route to a point 39.5 miles from the NAVAID then increasing in width on a 6½-degree angle on each side of the route to points where the lines defining the angular divergence intercept similar lines from the adjacent NAVAID.



1711.a. Illustration

b. On high level airways and routes and direct courses above FL 230 formed by non-directional radio beacons, low frequency range courses or a combination of one of these and a VOR radial—*4.5 miles* one each side of the route to a point 30.2 miles from the NAVAID, then increasing in width of a 8½-degree angle on each side of the route to points where the lines defining the angular divergence intercept similar lines from the adjacent NAVAID.



1711.b. Illustration

c. Where a course change at FL 180 and above is 16 degrees through 90 degrees, protect additional airspace on the overflown side beginning at the point where the course changes until the aircraft is reestablished on course, as follows:

(1) An amount determined by the use of the appropriate Canadian turning template and covered in a Letter of Agreement with the appropriate Canadian air traffic control unit, or

1711.c.(1) **Note.**—Templates have been supplied to Canadian ATC units for use in determining airspace to be protected for aircraft turning. Where possible, advance coordination should be accomplished with the appropriate Canadian unit to obtain a determination by template as to the amount of additional airspace to be protected for turning aircraft.

(2) FL 180 to FL 450 inclusive—*16 miles.*

(3) Above FL 450—*18 miles.*

d. When the course change at FL 180 and above is 91 degrees through 180 degrees, in addition to additional airspace beyond the turning point specified in **c.** (2) and **c.** (3) protect additional airspace on the overflown side until the aircraft is reestablished on course, as follows:

(1) FL 180 to FL 450 inclusive—*27 miles.*

(2) Above FL 450—*34 miles.*

1712. INITIAL SEPARATION OF DEPARTURES AND ARRIVALS

a. When aircraft will fly the same course initially, but will fly diverging courses within 5 minutes after takeoff, provide *3 minutes* separation until courses diverge.

1712.a. **Reference.**—Minima on Diverging Courses, 340.

b. When aircraft using DME will fly the same course initially, but will fly diverging courses within 15 miles after takeoff, provide *5 miles* separation until courses diverge.

1712.b. **Reference.**—Minima on Diverging Courses, 340.

c. Separate aircraft that will fly the same course when the following aircraft will climb through the altitude assigned to the leading aircraft by using a minimum of *5 minutes* until the following aircraft passes through the altitude of the leading aircraft or *10 miles* if both aircraft are using DME.

1712.c. **Reference.**—Minima on Same Course, 341.

d. Separate a departing aircraft from arriving aircraft making an instrument approach to the same airport by permitting a takeoff which differs by at least 45 degrees from the reciprocal of the final approach course until one of the following conditions exists:

1712.d. **Reference.**—Separation Minima, 345.

(1) The arriving aircraft reports commencing procedure turn if making a complete instrument approach, or

(2) The arriving aircraft is estimated to be 3 minutes from the airport if making a straight-in approach.

→1713. VISUAL SEPARATION AND VFR

An aircraft may be cleared to maintain "1,000 feet on top" (in lieu of VFR-on-top) or may be issued VFR separation when requested by the pilot except:

1713. **Reference.**—VFR-on-Top, 492.

a. In Block Airspace.

b. In controlled high level airspace at or below FL 450.

c. Within airspace reservations, unless it is a military aircraft operating "at least 1,000 feet on top" or VFR. Such military aircraft may be cleared into or through a military reservation.

1714. SPECIAL VFR

Authorize Special VFR operations to or from Canadian airports, within control zones, with the following Canadian Special VFR weather minimums:

1714. **Reference.**—Authorization, 470; Special VFR, Chapter 3, Section 16.

a. Aircraft other than helicopters:

(1) Ceiling 500 feet and visibility three miles.

(2) Ceiling 600 feet and visibility two miles.

(3) Ceiling 700 feet and visibility one mile.

b. Helicopters:

(1) Ceiling 300 feet and visibility three miles.

Appendix 3. AIRCRAFT WEIGHT CLASSES AND GROUPS

Manufacturer/Model	Type Designator Civil	Type Designator Military	Weight Class/ Group
Aeronca (USA)			
Aeronca Champion	AR58		S/2
Chief/Super Chief	AR11		S/2
Sedan	AR15		S/2
Aero Spaceline (USA)			
Guppy	AP52		L/5
Mini Guppy	AP3M		L/5
Pregnant Guppy	AP1P		L/5
Super Guppy/ Turbine	AP25/AP45		L/5
Aerospatiale (France)			
Caravelle	S210		L/4
Concorde	CONC		H/5
Corvette SN601	S601		L/3
Rallye MS 880/881/883	S880		S/3
Rallye Commodore MS 892	S892		S/2
Rallye Minerva MS 894	S894		S/2
Airbus Industries (International)			
Airbus	A300		H/5
Aion, Inc. (USA)			
Aircope A2	F02		S/2
Andrie Tupolev (USSR)			
Tu-114	TU114		H/5
Tu-144	TU144		H/5
Antonov (USSR)			
AN-10	AN10		L/4
AN-12	AN12		L/5
Avro (A.V. Roe) (U.K.)			
Anson	AV52		L/3
CF-100		CF00	L/4
Lancaster	LANC		L/4
Shackleton		SHC3	L/4
Beagle Aircraft (U.K.)			
Airdale	BT10		S/2
Model 206S	BT6S		S/3
Beech Aircraft (USA)			
Airliner	BE99		S/2
Baron	BE55	T42	S/2
Baron 58	BE58		S/2
Bonanza 33	BE33		S/2
Bonanza 35	BE35		S/2
Bonanza 36	BE36		S/2
Duke	BE60		S/3
Duchess	BE76		S/2
King Air 90	BE90	U21	S/2
King Air 100	BE10		S/3
Mentor	BE45	T34	S/2
Queen Air 65/A65/70	BE65		S/2
Queen Air 89	BE80		S/2
Seminole		U8	S/2
Sierra 24	BE24		S/2
Sport 19	BE19		S/2
Stagger Wing	BE17		S/2
Sundowner	BE23		S/2
Super H18	BE8S		S/2
→ Super King Air 200	BE20	C12	S/3
Super Queen 88	BE88		S/2
Travelair	BE95		S/2
Twin Beech 18	BE18	C45	S/2
Twin Bonanza	BE50		S/2
Bellanca Aircraft (Includes Downer/ Northern) (USA)			
Citabria	CH10		S/2
Citabria 7ECA	CH9		S/2
Cruisair Sr./Cruise-master 14-19	BL14		S/2
Decathlon	BL30		S/2
Scout	BL28		S/2
Viking	BL26		S/2
Boeing Aircraft (USA)			
707 100/200	B707		L/5
707 300/400	H/B707		H/5
720	B720		L/5
720B	B72S		L/5
727	B727		L/4
737	B737	T43	L/4
747	B747	E4A	H/5A
747SP	B74S		H/5
767	B767		H/5
AWACS		E3A	H/5
EC135		E135	L/5
Stearman	B75		S/2
Stratofortress		B52	H/5
Stratofreighter		KC97	L/4
Stratolifter B717		C135	L/5
Stratotanker KC135		KC135	L/5
VC37B		C137B	L/5
VC37C		C137C	H/5
YC14		YC14	L/4
Bristol Aircraft (U.K.)			
Britannia 310	BR31		L/5

Manufacturer/Model	Type Designator Civil	Type Designator Military	Weight Class/ Group
British Aerospace Corp. (U.K.)			
BAC 111	BA11		L/4
Harrier		AV8*	L/4
HS/DH 125-600/700	HS25		L/3
HS 748 Series	HS748		L/4
Super VC 10	BA15	VC15	H/5
Trident	HS21		L/4
Vanguard	VC9		L/4
VC 10	BA10	VC10	H/5
Viscount	VC7		L/4
Vulcan		VLCN	H/4
Britton Norman Ltd. (U.K.)			
Islander	BN2		S/2
Trislander-Mark 3	BN3		S/2
Bushmaster Aircraft Corp. (USA)			
Bushmaster 2000	BU20		L/3
Camair (USA)			
Model 480 (Twin Navion)	CM48		S/3
Yukon	CC06		L/4
Candair Ltd. (Canada)			
Argus	CL28	CP07	L/4
Challenger	CL60		L/4
Cosmopolitan, (Convair 540)	CL66/CV54	CC09	L/4
North Star	NSTR		L/4
Starfighter	CF04	F104*	L/5
Yukon (Freightliner)	CL44	CC06	L/5
Cessna Aircraft (USA)			
120	C120		S/2
140	C140		S/2
150	C150		S/2
152	C152		S/2
170	C170		S/2
172 Skyhawk	C172	T41	S/2
175 Skylark	C175		S/2
177 Cardinal	C177		S/2
180	C180		S/2
182	C182		S/2
185 Skywagon	C185		S/2
188 Agwagon	C188		S/2
190	C190		S/2
195	C195		S/2
205	C205		S/2
206	C206		S/2
207 Super Skywagon	C207		S/2
210	C210		S/2
305/321 Bird Dog	C305	O1	S/2
310	C310	U3	S/2
318		T37*	S/2
318E Dragonfly		A37*	S/2
320 Skynight	C320		S/2
336 Skymaster	C336		S/2
337 Super Skymaster	C337	O2	S/2
340	C340		S/2
401	C401		S/2
402	C402		S/2
411	C411		S/2
414	C414		S/2
421	C421		S/2
441	C441		S/2
Citation I/II	C500		S/3
Citation III	C50S		S/3
Champion Aircraft Corp. (USA)			
Challenger	CH8		S/2
Lancer 402	CH40		S/2
Traveler/Tri-Traveler	CH7		S/2
Curtis Wright (USA)			
Commando	CW46	C46	L/3
Dassault (France)			
Falcon 10	DA10		L/3
Falcon 20	FFJ		L/3
Falcon 50	DA50		L/3
Mercure	DA01		L/5
Mercure 200	DA02		L/5
DeHavilland (Canada & U.K.)			
Beaver	DH2	U6	S/2
Buffalo	DH5	C8	L/3
→ Caribou	DH4	C7A	L/3
Chipmunk	DH1		S/2
Comet 2	DH62		L/5
Comet 4	DH64		L/5
Dash 7	DH7		L/2**
Dove (Devon)	DH10		S/2
Heron	DH11		S/2
Otter	DH3	U1	S/2
Turbo Beaver	DH2T		S/2
Twin Otter	DH6	U18	S/2
Dornier GmbH (West Germany)			
Dornier 27	DO27		S/3
Dornier 28	DO28		S/3
Embraer (Brazil)			
Bandeirante	E110		S/4

Appendix 4. PILOT/CONTROLLER GLOSSARY

This Glossary was compiled to promote a common understanding of the terms used in the Air Traffic Control system. It includes those terms which are intended for pilot/controller communications. Those terms most frequently used in pilot/controller communications are printed in ***bold italics***. The definitions are primarily defined in an operational sense applicable to both users and operators of the National Airspace System. Use of the Glossary will preclude any misunderstandings concerning the system's design, function, and purpose.

Because of the international nature of flying, terms used in the "Lexicon," published by the International Civil Aviation Organization (ICAO), are included when they differ from FAA definitions. These terms are *italicized*. For the reader's convenience, there are also cross references to related terms in other parts of the Glossary and to other documents, such as the Federal Aviation Regulations (FARs) and the Airman's Information Manual (AIM).

This Glossary will be revised as necessary to maintain a common understanding of the system.

ABBREVIATED IFR FLIGHT PLANS—An authorization by ATC requiring pilots to submit only that information needed for the purpose of ATC. It includes only a small portion of the usual IFR flight plan information. In certain instances, this may be only aircraft identification, location, and pilot request. Other information may be requested if needed by ATC for separation/control purposes. It is frequently used by aircraft which are airborne, desire an instrument approach, or by aircraft on the ground which desire a climb to VFR on top. (See VFR ON TOP) (Refer to AIM)

ABEAM—An aircraft is "abeam" a fix, point or object when that fix, point or object is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point.

ABORT—To terminate a preplanned aircraft maneuver; e.g., an aborted takeoff.

ACKNOWLEDGE—Let me know that you have received and understand my message.

ACROBATIC FLIGHT—An intentional maneuver involving an abrupt change in an aircraft's attitude, an abnormal attitude, or abnormal acceleration, not necessary for normal flight. (Refer to FAR Part 91)

ICAO—ACROBATIC FLIGHT—Maneuvers intentionally performed by an aircraft involving an abrupt change in its attitude, an abnormal attitude, or an abnormal variation in speed.

ADDITIONAL SERVICES—Advisory information provided by ATC which includes but is not limited to the following.

1. Traffic advisories.
2. Vectors, when requested by the pilot, to assist aircraft receiving traffic advisories to avoid observed traffic.
3. Altitude deviation information of 300 feet or more from an assigned altitude as observed on a verified (reading correctly) automatic altitude readout (Mode C).
4. Advisories that traffic is no longer a factor.
5. Weather and chaff information.
6. Weather assistance.
7. Bird activity information.
8. Holding pattern surveillance.

Additional services are provided to the extent possible contingent only upon the controller's capability to fit them into the performance of higher priority duties and on the basis of limitations of the radar, volume of traffic, frequency congestion and controller workload. The controller has complete discretion for determining if he is able to provide or continue to provide a service in a particular case. The controller's reason not to provide or continue to provide a service in a particular case is not subject to question by the pilot and need not be made known to him. (See Traffic Advisories) (Refer to AIM)

ADMINISTRATOR—The Federal Aviation Administrator or any person to whom he has delegated his authority in the matter concerned.

ADVISE INTENTIONS—Tell me what you plan to do.

ADVISORY—Advice and information provided to assist pilots in the safe conduct of flight and aircraft movement. (See Advisory Service)

ADVISORY FREQUENCY—The appropriate frequency to be used for Airport Advisory Service. (See Airport Advisory Service and UNICOM) (Refer to Advisory Circular No. 90-42, AIM)

ADVISORY SERVICE—Advice and information provided by a facility to assist pilots in the safe conduct of flight and aircraft movement. (See Airport Advisory Service, Traffic Advisories, Safety Advisories, Additional Services, Radar Advisory, En Route Flight Advisory Service) (Refer to AIM)

→**AERIAL REFUELING/IN-FLIGHT REFUELING**—A procedure used by the military to transfer fuel from one aircraft to another during flight. (Refer to VFR/IFR Wall Planning Charts)

AERODROME—A defined area on land or water (including any buildings, installations, and equipment) intended to be used either wholly or in part for the arrival, departure, and movement of aircraft.

AERONAUTICAL BEACON—A visual navaid displaying flashes of white and/or colored light to indicate the location of an airport, a heliport, a landmark, a certain point of a Federal airway in mountainous terrain, or a hazard. (See Airport Rotating Beacon) (Refer to AIM)

AERONAUTICAL CHART—A map used in air navigation containing all or part of the following: topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace, and airports. Commonly used aeronautical charts are:

1. Sectional Charts—1:500,000—Designed for visual navigation of slow or medium speed aircraft. Topographic information on these charts features the portrayal of relief and a judicious selection of visual check points for VFR flight. Aeronautical information includes visual and radio aids to navigation, airports, controlled airspace, restricted area, obstructions and related data.
2. VFR Terminal Area Charts—1:250,000—Depict Terminal Control Area (TCA) airspace which provides for the control or segregation of all the aircraft within the TCA. The chart depicts topographic information and aeronautical information which includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.
3. World Aeronautical Charts (WAC)—1:1,000,000—Provide a standard series of aeronautical charts covering land areas of the world at a size and scale convenient for navigation by moderate speed aircraft. Topographic information includes cities and towns, principal roads, railroads, distinctive landmarks, drainage, and relief. Aeronautical information includes visual and radio aids to navigation, airports, airways, restricted areas, obstructions, and other pertinent data.
4. En Route Low Altitude Charts—Provide aeronautical information for en route instrument navigation (IFR) in the low altitude stratum. Information includes the portrayal of airways, limits of controlled airspace, position identification and frequencies of radio aids, selected airports, minimum en route and minimum obstruction clearance altitudes, airway distances, reporting points, restricted areas, and related data. Area charts which are a part of this series furnish terminal data at a large scale in congested areas.
5. En Route High Altitude Charts—Provide aeronautical information for en route instrument navigation (IFR) in the high altitude stratum. Information includes the portrayal of jet routes, identification and frequencies of radio aids, selected airports, distances, time zones, special use airspace, and related information.
6. Area Navigation (RNAV) High Altitude Charts—Provide aeronautical information for en route IFR navigation for high altitude air routes established for aircraft equipped with RNAV systems. Information includes portrayal of RNAV routes, waypoints, track angles, changeover points, distances, selected navigational aids and airports, special use airspace, oceanic routes, and transitional information.
7. Instrument Approach Procedures (IAP) Charts—Portray the aeronautical data which is required to execute an instrument approach to an airport. These charts depict the procedures, including all related data, and the airport diagram. Each procedure is designated for use with a specific type of electronic navigation system including NDB, TACAN, VOR, ILS, and RNAV. These charts are identified by the type of navigational aid(s) which provide final approach guidance.
8. Standard Instrument Departure (SID) Charts—Designed to expedite clearance delivery and to facilitate transition between take-off and en route operations. Each SID procedure is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.

9. Standard Terminal Arrival (STAR) Charts—Designated to expedite air traffic control arrival route procedures and to facilitate transition between en route and instrument approach operations. Each STAR procedure is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.
10. Airport Taxi Charts—Designed to expedite the efficient and safe flow of ground traffic at an airport. These charts are identified by the official airport name, e.g., Washington National Airport.

ICAO-AERONAUTICAL CHART—A representation of a portion of the earth, its culture and relief, specifically designated to meet the requirements of air navigation.

AFFIRMATIVE—Yes.

AIR CARRIER DISTRICT OFFICE/ACDO—An FAA field office serving an assigned geographical area, staffed with Flight Standards personnel serving the aviation industry and the general public on matters related to the certification and operation of scheduled air carriers and other large aircraft operations.

AIRCRAFT—Device/s that are used or intended to be used for flight in the air and when used in air traffic control terminology may include the flight crew.

ICAO—AIRCRAFT—Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

AIRCRAFT APPROACH CATEGORY—A grouping of aircraft based on a speed of 1.3 times the stall speed in the landing configuration at maximum gross landing weight. An aircraft shall fit in only one category. If it is necessary to maneuver at speeds in excess of the upper limit of a speed range for a category, the minimums for the next higher category should be used. For example, an aircraft which falls in Category A, but is circling to land at a speed in excess of 91 knots, should use the approach Category B minimums when circling to land. The categories are as follows:

1. Category A—Speed less than 91 knots.
2. Category B—Speed 91 knots or more but less than 121 knots.
3. Category C—Speed 121 knots or more but less than 141 knots.
4. Category D—Speed 141 knots or more but less than 166 knots.
5. Category E—Speed 166 knots or more.

(Refer to FAR Parts 1 and 97)

AIRCRAFT CLASSES—For the purposes of Wake Turbulence Separation Minima, ATC classifies aircraft as Heavy, Large and Small as follows:

1. Heavy—Aircraft capable of takeoff weights of 300,000 pounds or more whether or not they are operating at this weight during a particular phase of flight.
2. Large—Aircraft of more than 12,500 pounds, maximum certificated takeoff weight, up to 300,000 pounds.
3. Small—Aircraft of 12,500 pounds or less, maximum certificated takeoff weight. (Refer to AIM)

AIR DEFENSE EMERGENCY—A military emergency condition declared by a designated authority. This condition exists when an attack upon the continental U.S., Alaska, Canada, or U.S. installations in Greenland by hostile aircraft or missiles is considered probable, is imminent, or is taking place. (Refer to AIM)

AIR DEFENSE IDENTIFICATION ZONE/ADIZ—The area of airspace over land or water, extending upward from the surface, within which the ready identification, the location, and the control of aircraft are required in the interest of national security.

1. Domestic Air Defense Identification Zone—An ADIZ within the United States along an international boundary of the United States.
2. Coastal Air Defense Identification Zone—An ADIZ over the coastal waters of the United States.
3. Distant Early Warning Identification Zone (DEWIZ)—An ADIZ over the coastal waters of the State of Alaska.

ADIZ locations, and operating and flight plan requirements for civil aircraft operations are specified in FAR Part 99. (Refer to AIM)

AIRMAN'S INFORMATION MANUAL/AIM—A publication containing Basic Flight Information and ATC Procedures designed primarily as a pilot's instructional manual for use in the National Airspace System of the United States.

ICAO—AERONAUTICAL INFORMATION PUBLICATION—A publication issued by or with the authority of a state and containing aeronautical information of a lasting character essential to air navigation.

→**AIRMET/AIRMAN'S METEOROLOGICAL INFORMATION**—In-flight weather advisories issued only to amend the area forecast concerning weather phenomena which are of operational interest to all aircraft and potentially hazardous to aircraft having limited capability because of lack of equipment, instrumentation, or pilot qualifications. AIRMETs concern weather of less severity than that covered by SIGMETs or Convective SIGMETs. AIRMETs cover moderate icing, moderate turbulence, sustained winds of 30 knots or more at the surface, widespread areas of ceilings less than 1,000 feet and/or visibility less than 3 miles, and extensive mountain obscurement. (See SIGMET, Convective SIGMET) (Refer to AIM)

AIR NAVIGATION FACILITY—Any facility used in, available for use in, or designed for use in, aid of air navigation, including landing areas, lights, any apparatus or equipment for disseminating weather information, for signaling, for radio-directional finding, or for radio or other electrical communication, and any other structure or mechanism having a similar purpose for guiding or controlling flight in the air or the landing and takeoff of aircraft. (See Navigation Aid)

AIRPORT—An area of land or water that is used or intended to be used for the landing and takeoff or aircraft and includes its buildings and facilities, if any.

AIRPORT ADVISORY AREA—The area within five statute miles of an airport not served by a control tower, i.e., there is no tower or the tower is not in operation, on which is located a Flight Service Station. (See Airport Advisory Service) (Refer to AIM)

AIRPORT ADVISORY SERVICE/AAS—A service provided by Flight Service Stations at airports not served by a control tower. This service consists of providing information to arriving and departing aircraft concerning wind direction and speed, favored runway, altimeter setting, pertinent known traffic, pertinent known field conditions, airport taxi routes and traffic patterns, and authorized instrument approach procedures. This information is advisory in nature and does not constitute an ATC clearance. (See Airport Advisory Area)

AIRPORT ELEVATION/FIELD ELEVATION—The highest point of an airport's usable runways measured in feet from mean sea level. (See Touchdown Zone Elevation)

ICAO—AERODROME ELEVATION—The elevation of the highest point of the landing area.

AIRPORT/FACILITY DIRECTORY—A publication designed primarily as a pilot's operational manual containing all airports, seaplane bases and heliports open to the public including communications data, navigational facilities, and certain special notices and procedures. This publication is issued in seven volumes according to geographical area.

AIRPORT INFORMATION DESK/AID—An airport unmanned facility designed for pilot self-service briefing, flight planning, and filing of flight plans. (Refer to AIM)

AIRPORT LIGHTING—Various lighting aids that may be installed on an airport. Types of airport lighting include:

1. Approach Light System/ALS—An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams in a directional pattern by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach for landing.

   Condenser-Discharge Sequential Flashing Lights/Sequenced Flashing Lights may be installed in conjunction with the ALS at some airports.

   Types of Approach Light Systems are:

   a. ALSF-I—Approach Light System with Sequenced Flashing Lights in ILS Cat-I configuration.

   b. ALSF-II—Approach Light System with Sequenced Flashing Lights in ILS Cat-II configuration.

   → c. SSALF—Simplified Short Approach Light System with Sequenced Flashing Lights.

   d. SSALR—Simplified Short Approach Light System with Runway Alignment Indicator Lights.

   e. MALSF—Medium Intensity Approach Light System with Sequenced Flashing Lights.

   f. MALSR—Medium Intensity Approach Light System with Runway Alignment Indicator Lights.

   g. LDIN—Sequenced Flashing Lead-in Lights.

   h. RAIL—Runway Alignment Indicator Lights (Sequenced Flashing Lights which are installed only in combination with other light systems).

2. Runway Lights/Runway Edge Lights—Lights having a prescribed angle of emission used to define the lateral limits of a runway. Runway lights are uniformly spaced at intervals of approximately 200 feet, and the intensity may be controlled or preset.

3. Touchdown Zone Lighting—Two rows of transverse light bars located symmetrically about the runway centerline normally at 100 foot intervals. The basic system extends 3,000 feet along the runway.

4. Runway Centerline Lighting—Flush centerline lights spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway.

5. Threshold Lights—Fixed green lights arranged symmetrically left and right of the runway centerline, identifying the runway threshold.

6. Runway End Identifier Lights/REIL—Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

7. Visual Approach Slope Indicator/VASI—An airport lighting facility providing vertical visual approach

slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is "on path" if he sees red/white, "above path" if white/white, and "below path" if red/red. Some airports serving large aircraft have three-bar VASIs which provide two visual glide paths to the same runway.

8. Boundary Lights—Lights defining the perimeter of an airport or landing area. (Refer to AIM)

→**AIRPORT MARKING AIDS**—Markings used on runway and taxiway surfaces to identify a specific runway, a runway threshold, a centerline, a hold line, etc. A runway should be marked in accordance with its present usage such as:

1. Visual.
2. Non-precision instrument.
3. Precision instrument. (Refer to AIM)

AIRPORT ROTATING BEACON—A visual NAVAID operated at many airports. At civil airports, alternating white and green flashes indicate the location of the airport. At military airports, the beacons flash alternately white and green, but are differentiated from civil beacons by dualpeaked (two quick) white flashes between the green flashes. (See Special VFR Operations, Instrument Flight Rules) (Refer to AIM, Rotating Beacons)

ICAO—AERODROME BEACON—Aeronautical beacon used to indicate the location of an aerodrome.

AIRPORT SURFACE DETECTION EQUIPMENT/ASDE—Radar equipment specifically designed to detect all principal features on the surface of an airport including aircraft and vehicular traffic and to present the entire image on a radar indicator console in the control tower. Used to augment visual observation by tower personnel of aircraft and/or vehicular movements on runways and taxiways.

AIRPORT SURVEILLANCE RADAR/ASR—Approach control radar used to detect and display an aircraft's position in the terminal area. ASR provides range and azimuth information but does not provide elevation data. Coverage of the ASR can extend up to 60 miles.

AIRPORT TRAFFIC AREA—Unless otherwise specifically designated in FAR Part 93, that airspace within a horizontal radius of 5 statute miles from the geographical center of any airport at which a control tower is operating, extending from the surface up to, but not including, an altitude of 3,000 feet above the elevation of the airport. Unless otherwise authorized or required by ATC, no person may operate an aircraft within an airport traffic area except for the purpose of landing at, or taking off from, an airport within that area. ATC authorizations may be given as individual approval of specific operations or may be contained in written agreements between airport users and the tower concerned. (Refer to FAR Parts 1 and 91)

AIRPORT TRAFFIC CONTROL SERVICE—A service provided by a control tower for aircraft operating on the movement area and in the vicinity of an airport. (See Movement Area, Tower)

ICAO—AERODROME CONTROL SERVICE—Air traffic control service for aerodrome traffic.

AIR ROUTE SURVEILLANCE RADAR/ARSR—Air route traffic control center (ARTCC) radar used primarily to detect and display an aircraft's position while en route between terminal areas. The ARSR enables controllers to provide radar air traffic control service when aircraft are within the ARSR coverage. In some instances, ARSR may enable an ARTCC to provide terminal radar services similar to but usually more limited than those provided by a radar approach control.

AIR ROUTE TRAFFIC CONTROL CENTER/ARTCC—A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft. (See NAS Stage A, En Route Air Traffic Control Service) (Refer to AIM)

AIRSPEED—The speed of an aircraft relative to its surrounding air mass. The unqualified term "airspeed" means one of the following:

1. Indicated Airspeed—The speed shown on the aircraft airspeed indicator. This is the speed used in pilot/controller communications under the general term "airspeed." (Refer to FAR Part 1)

2. True Airspeed—The airspeed of an aircraft relative to undisturbed air. Used primarily in flight planning and en route portion of flight. When used in pilot/controller communications, it is referred to as "true airspeed" and not shortened to "airspeed."

AIRSTART—The starting of an aircraft engine while the aircraft is airborne, preceded by engine shutdown during training flights or by actual engine failure.

AIR TRAFFIC—Aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

ICAO—AIR TRAFFIC—All aircraft in flight or operating on the maneuvering area of an aerodrome.

AIR TRAFFIC CLEARANCE/ATC CLEARANCE—An authorization by air traffic control, for the purpose of

preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace. (See ATC Instructions)

ICAO—AIR TRAFFIC CONTROL CLEARANCE—Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.

AIR TRAFFIC CONTROL/ATC—A service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.

ICAO—AIR TRAFFIC CONTROL SERVICE—A service provided for the purpose of:

1. Preventing collisions:
   a. Between aircraft, and
   b. On the maneuvering area between aircraft and obstructions, and
2. Expediting and maintaining an orderly flow of air traffic.

AIR TRAFFIC CONTROL SERVICE—(See Air Traffic Control)

AIR TRAFFIC CONTROL SPECIALIST/CONTROLLER—A person authorized to provide air traffic control service. (See Air Traffic Control Service, Flight Service Station)

ICAO—CONTROLLER—A person authorized to provide air traffic control service.

→**AIR TRAFFIC CONTROL COMMAND CENTER/ATCCC**—An air traffic service facility consisting of four operational units.

1. Central Flow Control Function/CFCF—Responsible for coordination and approval of all major intercenter flow control restrictions on a system basis in order to obtain maximum utilization of the airspace. (See Fuel Advisory Departure, Quota Flow Control)

2. Central Altitude Reservation Function/CARF—Responsible for coordinating, planning, and approving special user requirements under the Altitude Reservation (ALTRV) concept. (See Altitude Reservation)

3. Airport Reservation Office/ARO—Responsible for approving IFR flights at designated high density traffic airports (John F. Kennedy, LaGuardia, O'Hare, and Washington National) during specified hours. (Refer to FAR Part 93, Airport/Facility Directory)

4. ATC Contingency Command Post—A facility which enables the FAA to manage the ATC system when significant portions of the system's capabilities have been lost or are threatened.

AIRWAY BEACON—Used to mark airway segments in remote mountain areas. The light flashes Morse Code to identify the beacon site. (Refer to AIM)

AIRWAY/FEDERAL AIRWAY—A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids. (Refer to FAR Part 71, AIM)

ICAO—AIRWAY—A control area or portion thereof established in the form of corridor equipped with radio navigational aids.

ALERT AREA—(See Special Use Airspace)

ALERT NOTICE/ALNOT—A message sent by a flight Service Station (FSS) or Air Route Traffic Control Center (ARTCC) that requests an extensive communication search for overdue, unreported, or missing aircraft.

ALPHA-NUMERIC DISPLAY/DATA BLOCK—Letters and numerals used to show identification, altitude, beacon code, and other information concerning a target on a radar display. (See Automated Radar Terminal Systems, NAS Stage A)

ALTERNATE AIRPORT—An airport at which an aircraft may land if a landing at the intended airport becomes inadvisable.

ICAO—ALTERNATE AERODROME—An aerodrome specified in the flight plan to which a flight may proceed when it becomes inadvisable to land at the aerodrome of intended landing.

ALTIMETER SETTING—The barometric pressure reading used to adjust a pressure altimeter for variations in existing atmospheric pressure or to the standard altimeter setting (29.92). (Refer to FAR Part 91, AIM)

ALTITUDE—The height of a level, point, or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL). (See Flight Level)

1. MSL Altitude—Altitude expressed in feet measured from mean sea level.
2. AGL Altitude—Altitude expressed in feet measured above ground level.
3. Indicated Altitude—The altitude as shown by an altimeter. On a pressure or barometric altimeter it is altitude as shown uncorrected for instrument error and uncompensated for variation from standard atmospheric conditions.

ICAO—Control Zone—A controlled airspace extending upwards from the surface of the earth to a specified upper limit.

4. Terminal Control Area/TCA—Controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to operating rules and pilot and equipment requirements specified in FAR part 91. TCA's are depicted on Sectional, World Aeronautical, En Route Low Altitude, DOD FLIP, and TCA charts. (Refer to FAR Part 91, AIM)

   ICAO—Terminal Control Area— A control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes.

5. Transition Area—Controlled airspace extending upward from 700 feet or more above the surface of the earth when designated in conjunction with an airport for which an approved instrument approach procedure has been prescribed or from 1,200 feet or more above the surface of the earth when designated in conjunction with airway route structures or segments. Unless otherwise limited, transition areas terminate at the base of the overlying controlled airspace. Transition areas are designed to contain IFR operations in controlled airspace during portions of the terminal operation and while transiting between the terminal and en route environment.

6. Positive Control Area/PCA—Airspace designated in FAR Part 71 within which there is positive control of aircraft. Flight in PCA is normally conducted under instrument flight rules. PCA is designated throughout most of the conterminous United States and its vertical extent is from 18,000 feet MSL to and including flight level 600. In Alaska PCA does not include the airspace less than 1,500 feet above the surface of the earth, nor the airspace over the Alaska Peninsula west of longitude 160°00′00″W. Rules for operating in PCA are found in FARs 91.97 and 91.24.

CONTROLLER—(See Air Traffic Control Specialist)

CONTROL SECTOR—An airspace area of defined horizontal and vertical dimensions for which a controller, or group of controllers, has air traffic control responsibility, normally within an air route traffic control center or an approach control facility. Sectors are established based on predominant traffic flows, altitude strata, and controller workload. Pilot-communications during operations within a sector are normally maintained on discrete frequencies assigned to the sector. (See Discrete Frequency)

CONTROL SLASH—A radar beacon slash representing the actual position of the associated aircraft. Normally, the control slash is the one closest to the interrogating radar beacon site. When ARTCC radar is operating in narrowband (digitized) mode, the control slash is converted to a target symbol.

CONTROL ZONE—(See Controlled Airspace)

→***CONVECTIVE SIGMET*/CONVECTIVE SIGNIFICANT METEOROLIGICAL INFORMATION**—A weather advisory concerning convective weather significant to the safety of all aircraft. Convective SIGMETs are issued for tornadoes, lines of thunderstorms, embedded thunderstorms of any intensity level, areas of thunderstorms greater than or equal to VIP level 4 with an areal coverage of 4/10 (40%) or more, and hail ¾ inch or greater. (See SIGMET, AIRMET) (Refer to AIM)

COORDINATES—The intersection of lines of reference, usually expressed in degrees/minutes/seconds of latitude and longitude, used to determine position or location.

COORDINATION FIX—The fix in relation to which facilities will handoff, transfer control of an aircraft, or coordinate flight progress data. For terminal facilities, it may also serve as a clearance for arriving aircraft.

CORRECTION—An error has been made in the transmission and the correct version follows:

COURSE—

1. The intended direction of flight in the horizontal plane measured in degrees from north.
2. The ILS localizer signal pattern usually specified as front course or back course. (See Bearing, Radial, Instrument Landing Systems)

CRITICAL ENGINE—The engine which, upon failure, would most adversely affect the performance or handling qualities of an aircraft.

CROSS (FIX) AT (ALTITUDE)—Used by ATC when a specific altitude restriction at a specified fix is required.

CROSS (FIX) AT OR ABOVE (ALTITUDE)—Used by ATC when an altitude restriction at a specified fix is required. It does not prohibit the aircraft from crossing the fix at a higher altitude than specified; however, the higher altitude may not be one that will violate a succeeding altitude restriction or altitude assignment. (See Altitude Assignment, Altitude Restriction) (Refer to AIM)

CROSS (FIX) AT OR BELOW (ALTITUDE)—Used by ATC when a maximum crossing altitude at a specific fix is required. It does not prohibit the aircraft from crossing the fix at a lower altitude; however, it must be at or above the minimum IFR altitude. (See Minimum IFR Altitude, Altitude Restriction) (Refer to FAR Part 91)

CROSSWIND—

1. When used concerning the traffic pattern, the word means "crosswind leg." (See Traffic Pattern)
2. When used concerning wind conditions, the word means a wind not parallel to the runway or the path of an aircraft. (See Crosswind Component)

CROSSWIND COMPONENT—The wind component measured in knots at 90 degrees to the longitudinal axis of the runway.

CRUISE—Used in an ATC clearance to authorize a pilot to conduct flight at any altitude from the minimum IFR altitude up to and including the altitude specified in the clearance. The pilot may level off at any intermediate altitude within this block of airspace. Climb/descent within the block is to be made at the discretion of the pilot. However, once the pilot starts descent and reports leaving an altitude in the block he may not return to that altitude without additional ATC clearance. Further, it is approval for the pilot to proceed to and make an approach at destination airport and can be used in conjunction with:

1. An airport clearance limit at locations with a standard/special instrument approach procedure. The FARs require that if an instrument letdown to an airport is necessary the pilot shall make the letdown in accordance with a standard/special instrument approach procedure for that airport, or

2. An airport clearance limit at locations that are within/below/outside controlled airspace and without a standard/special instrument approach procedure. Such a clearance is NOT AUTHORIZATION for the pilot to descend under IFR conditions below the applicable minimum IFR altitude nor does it imply that ATC is exercising control over aircraft in uncontrolled airspace; however, it provides a means for the aircraft to proceed to destination airport, descend, and land in accordance with applicable FARs governing VFR flight operations. Also, this provides search and rescue protection until such time as the IFR flight plan is closed. (See Instrument Approach Procedure.

CRUISING ALTITUDE/LEVEL—An altitude or flight level maintained during en route level flight. This is a constant altitude and should not be confused with a cruise clearance. (See Altitude)

ICAO—CRUISING LEVEL—A level maintained during a significant portion of a flight.

DECISION HEIGHT/DH—With respect to the operation of aircraft, means the height at which a decision must be made during an ILS or PAR instrument approach to either continue the approach or to execute a missed approach.

ICAO—DECISION HEIGHT—A specified height at which a missed approach must be initiated if the required visual reference to continue the approach to land has not been established.

DECODER—The device used to decipher signals received from ATCRBS transponders to effect their display as select codes. (See Codes, Radar)

DEFENSE VISUAL FLIGHT RULES/DVFR—Rules applicable to flights within an ADIZ conducted under the visual flight rules in FAR Part 91. (See Air Defense Identification Zone) (Refer to FAR Part 99)

DELAY INDEFINITE (REASON IF KNOWN) EXPECT APPROACH/FURTHER CLEARANCE (TIME)—Used by ATC to inform a pilot when an accurate estimate of the delay time and the reason for the delay cannot immediately be determined; e.g., a disabled aircraft on the runway, terminal or center area saturation, weather below landing minimums, etc. (See Expect Approach Clearance, Expect Further Clearance)

DEPARTURE CONTROL—A function of an approach control facility providing air traffic control service for departing IFR and, under certain conditions, VFR aircraft. (See Approach Control) (Refer to AIM)

DEPARTURE TIME—The time an aircraft becomes airborne.

DEVIATIONS—

1. A departure from a current clearance, such as an off course maneuver to avoid weather or turbulence.

2. Where specifically authorized in the FAR's and requested by the pilot, ATC may permit pilots to deviate from certain regulations. (Refer to AIM)

DF APPROACH PROCEDURE—Used under emergency conditions where another instrument approach procedure cannot be executed. DF guidance for an instrument approach is given by ATC facilities with DF capability. (See DF Guidance, Direction Finder) (Refer to AIM)

DF FIX—The geographical location of an aircraft obtained by one or more direction finders. (See Direction Finder)

DF GUIDANCE/DF STEER—Headings provided to aircraft by facilities equipped with direction finding equipment. These headings, if followed, will lead the aircraft to a predetermined point such as the DF station or an airport. DF guidance is given to aircraft in distress or to other aircraft which request the service. Practice DF guidance is provided when workload permits. (See Direction Finder, DF Fix) (Refer to AIM)

GLIDE SLOPE/GS—Provides vertical guidance for aircraft during approach and landing. The glide slope consists of the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS, or
2. Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

ICAO—GLIDE PATH—A descent profile determined for vertical guidance during a final approach.

GLIDE SLOPE INTERCEPT ALTITUDE—The minimum altitude of the intermediate approach segment prescribed for a precision approach which assures required obstacle clearance. It is depicted on instrument approach procedure charts. (See Segments of an Instrument Approach Procedure, Instrument Landing System)

GO AHEAD—Proceed with your message. Not to be used for any other purpose.

GO AROUND—Instructions for a pilot to abandon his approach to landing. Additional instructions may follow. Unless otherwise advised by ATC, a VFR aircraft or an aircraft conducting a visual approach should overfly the runway while climbing to traffic pattern altitude and enter the traffic pattern via the crosswind leg. A pilot on an IFR flight plan making an instrument approach should execute the published missed approach procedure or proceed as instructed by ATC, e.g., "Go around" (additional instructions, if required). (See Low Approach, Missed Approach)

GRAPHIC NOTICES AND SUPPLEMENTAL DATA—A publication designed primarily as a pilot's operational manual containing a tabulation of parachute jump areas, special notice area graphics, terminal radar service area graphics, civil flight test areas, military refueling tracks and areas, and other data not requiring frequent change.

GROUND CLUTTER—A pattern produced on the radar scope by ground returns which may degrade other radar returns in the affected area. The effect of ground clutter is minimized by the use of moving target indicator (MTI) circuits in the radar equipment resulting in a radar presentation which displays only targets which are in motion. (See Clutter)

GROUND CONTROLLED APPROACH/GCA—A radar approach system operated from the ground by air traffic control personnel transmitting instructions to the pilot by radio. The approach may be conducted with surveillance radar (ASR) only or with both surveillance and precision approach radar (PAR). Usage of the term "GCA" by pilots is discouraged except when referring to a GCA facility. Pilots should specifically request a "PAR" approach when a precision radar approach is desired, or request an "ASR" or "surveillance" approach when a nonprecision radar approach is desired. (See Radar Approach)

GROUND SPEED—The speed of an aircraft relative to the surface of the earth.

GROUND VISIBILITY—(See Visibility)

→ **HANDOFF**—An action taken to transfer the radar identification of an aircraft from one controller to another if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will be transferred.

HAVE NUMBERS—Used by pilots to inform ATC that they have received runway, wind, and altimeter information only.

HEAVY **(AIRCRAFT)**—(See Aircraft Classes)

HEIGHT ABOVE AIRPORT/HAA—The height of the Minimum Descent Altitude above the published airport elevation. This is published in conjunction with circling minimums. (See Minimum Descent Altitude)

HEIGHT ABOVE LANDING/HAL—The height above a designated helicopter landing area used for helicopter instrument approach procedures. (Refer to FAR Part 97)

HEIGHT ABOVE TOUCHDOWN/HAT—The height of the Decision Height or Minimum Descent Altitude above the highest runway elevation in the touchdown zone (first 3,000 feet of the runway). HAT is published on instrument approach charts in conjunction with all straight-in minimums. (See Decision Height, Minimum Descent Altitude)

HELICOPTER/COPTER—Rotorcraft that, for its horizontal motion, depends principally on its engine-driven rotors.

ICAO—HELICOPTER—A heavier-than-air aircraft supported in flight by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

HELIPAD—That part of the landing and takeoff area designed for helicopters.

HELIPORT—An area of land, water, or structure used or intended to be used for the landing and takeoff of helicopters.

HERTZ/Hz—The standard radio equivalent of frequency in cycles per second of an electromagnetic wave. Kilohertz (kHz) is frequency of one thousand cycles per second. Megahertz (MHz) is a frequency of one million cycles per second.

HIGH FREQUENCY COMMUNICATIONS/HF COMMUNICATIONS—High radio frequencies (HF) between 3 and 30 MHz used for air-to-ground voice communication in overseas operations.

HIGH FREQUENCY/HF—The frequency band between 3 and 30 MHz. (See High Frequency Communications)

HIGH SPEED TAXIWAY/EXIT/TURNOFF—A long radius taxiway designed and provided with lighting or marking to define the path of aircraft, traveling at high speed (up to 60 knots), from the runway center to a point on the center of a taxiway. Also referred to as long radius exit or turn-off taxiway. The high speed taxiway is designed to expedite aircraft turning off the runway after landing, thus reducing runway occupancy time.

HOLD/HOLDING PROCEDURE—A predetermined maneuver which keeps aircraft within a specified airspace while awaiting further clearance from air traffic control. Also used during ground operations to keep aircraft within a specified area or at a specified point while awaiting further clearance from air traffic control. (See Holding Fix) (Refer to AIM)

HOLDING FIX—A specified fix identifiable to a pilot by NAVAIDS or visual reference to the ground used as a reference point in establishing and maintaining the position of an aircraft while holding. (See Fix, Hold, Visual Holding) (Refer to AIM)

ICAO—HOLDING POINT—A specified location, identified by visual or other means, in the vicinity of which the position of an aircraft in flight is maintained with air traffic control clearances.

HOMING—Flight toward a NAVAID, without correcting for wind, by adjusting the aircraft heading to maintain a relative bearing of zero degrees. (See Bearing)

ICAO—HOMING—The procedure of using the direction-finding equipment of one radio station with the emission of another radio station, where at least one of the stations is mobile, and whereby the mobile station proceeds continuously towards the other station.

HOW DO YOU HEAR ME?—A question relating to the quality of the transmission or to determine how well the transmission is being received.

IDENT—A request for a pilot to activate the aircraft transponder identification feature. This will help the controller to confirm an aircraft identity or to identify an aircraft. (Refer to AIM)

IDENT FEATURE—The special feature in the Air Traffic Control Radar Beacon System (ATCRBS) equipment. It is used to immediately distinguish one displayed beacon target from other beacon targets. (See Ident)

IF FEASIBLE, REDUCE SPEED TO (SPEED)—(See Speed Adjustment)

IF NO TRANSMISSION RECEIVED FOR (TIME)—Used by ATC in radar approaches to prefix procedures which should be followed by the pilot in event of lost communications. (See Lost Communications)

IFR AIRCRAFT/IFR FLIGHT— An aircraft conducting flight in accordance with instrument flight rules.

IFR CONDITIONS—Weather conditions below the minimum for flight under visual flight rules. (See Instrument Meteorological Conditions)

IFR DEPARTURE PROCEDURE—(See IFR Takeoff Minimums and Departure Procedures) (Refer to AIM)

IFR MILITARY TRAINING ROUTES (IR)—Routes used by the Department of Defense and associated Reserve and Air Guard units for the purpose of conducting low-altitude navigation and tactical training in both IFR and VFR weather conditions below 10,000 feet MSL at airspeeds in excess of 250 knots IAS.

IFR TAKEOFF MINIMUMS AND DEPARTURE PROCEDURES—FAR, Part 91, prescribes standard takeoff rules for certain civil users. At some airports, obstructions or other factors require the establishment of nonstandard takeoff minimums, departure procedures, or both, to assist pilots in avoiding obstacles during climb to the minimum en route altitude. Those airports are listed in NOS/DOD Instrument Approach Charts (IAPs) under a section entitled "IFR Takeoff Minimums and Departure Procedures." The NOS/DOD IAP chart legend illustrates the symbol used to alert the pilot to nonstandard takeoff minimums and departure procedures. When departing IFR from such airports, or from any airport where there are no departure procedures, SIDs, or ATC facilities available, pilots should advise ATC of any departure limitations. Controllers may query a pilot to determine acceptable departure directions, turns, or headings after takeoff. Pilots should be familiar with the departure procedures and must assure that their aircraft can meet or exceed any specified climb gradients.

ILS CATEGORIES

1. ILS Category I—An ILS approach procedure which provides for approach to a height above touchdown of not less than 200 feet and with runway visual range of not less than 1800 feet.
2. ILS Category II—An ILS approach procedure which provides for approach to a height above touchdown of not less than 100 feet and with runway visual range of not less than 1200 feet.

→ ***RADAR SERVICE TERMINATED***—Used by ATC to inform a pilot that he will no longer be provided any of the services that could be received while under radar contact. Radar service is automatically terminated and the pilot is not advised in the following cases:

1. An aircraft cancels its IFR flight plan, except within a TCA, TRSA, or where Stage II service is provided.
2. At the completion of a radar approach.
3. When an arriving VFR aircraft, receiving radar services, is advised to contact the tower.
4. When an aircraft conducting a visual approach or contact approach is advised to contact the tower.
5. When an aircraft making an instrument approach has landed or the tower has the aircraft in sight, whichever occurs first.

RADAR SURVEILLANCE—The radar observation of a given geographical area for the purpose of performing some radar function.

RADAR TRAFFIC ADVISORIES—(See Traffic Advisories)

RADAR TRAFFIC INFORMATION SERVICE—(See Traffic Advisories)

RADAR WEATHER ECHO INTENSITY LEVELS—Existing radar systems cannot detect turbulence. However, there is a direct correlation between the degree of turbulence and other weather features associated with thunderstorms and the radar weather echo intensity. The National Weather Service has categorized six (6) levels of radar weather echo intensity. The following list gives the weather features likely to be associated with these levels during thunderstorm weather situations:

1. Level 1 (WEAK) and Level 2 (MODERATE). Light to moderate turbulance is possible with lightning.
2. Level 3 (STRONG). Severe turbulence possible, lightning.
3. Level 4 (VERY STRONG). Severe turbulence likely, lightning.
4. Level 5 (INTENSE). Severe turbulence, lightning, organized wind gusts. Hail likely.
5. Level 6 (EXTREME). Severe turbulence, large hail, lightning, extensive wind gusts and turbulence.

RADIAL—A magnetic bearing extending from a VOR/VORTAC/TACAN navigation facility.

RADIO—

1. A device used for communication.
2. Used to refer to a Flight Service Station, e.g., "Seattle Radio" is used to call Seattle FSS.

RADIO ALTIMETER/RADAR ALTIMETER—Aircraft equipment which makes use of the reflection of radio waves from the ground to determine the height of the aircraft above the surface.

RADIO BEACON—(See Nondirectional Beacon)

RADIO MAGNETIC INDICATOR/RMI—An aircraft navigational instrument coupled with a gyro compass or similar compass that indicates the direction of a selected NAVAID and indicates bearing with respect to the heading of the aircraft.

RAMP—(See Apron)

READ BACK—Repeat my message back to me.

RECEIVING CONTROLLER/FACILITY—A controller/facility receiving control of an aircraft from another controller/facility.

REDUCE SPEED TO (SPEED)—(See Speed Adjustment)

RELEASE TIME—A departure time restriction issued to a pilot by ATC when necessary to separate a departing aircraft from the other traffic.

ICAO—RELEASE TIME—Time prior to which an aircraft should be given further clearance or prior to which it should not proceed in case of radio failure.

REMOTE COMMUNICATIONS AIR/GROUND FACILITY/RCAG—An unmanned VHF/UHF transmitter/receiver facility which is used to expand ARTCC air/ground communications coverage and to facilitate direct contact between pilots and controllers. RCAG facilities are sometimes not equipped with emergency frequencies 121.5 MHz and 243.0 MHz. (Refer to AIM)

REMOTE COMMUNICATIONS OUTLET/RCO-(A-O)—An unmanned air/ground communications facility remotely controlled by air traffic personnel at an ATCT, TRACON, TRACAB, FSS, or CS/T. The RCO may be UHF or VHF and will extend the communication range of the air traffic facility. There are several classes of RCO and the class is determined by the number of transmitters or receivers. The classes are: A, B, C, D, E, and O. RCO classes A, B, C, D, E may be used for air traffic control purposes. RCO class O is a nonprotected outlet and cannot be used for air traffic control. RCO(O)s are subject to undetected and prolonged outages.

REPORT—Used to instruct pilots to advise ATC of specified information, e.g., "Report passing Hamilton VOR."

REPORTING POINT—A geographical location in relation to which the position of an aircraft is reported. (See Compulsory Reporting Point) (Refer to AIM)

ICAO—REPORTING POINT—A specified geographical location in relation to which the position of an aircraft can be reported.

REQUEST FULL ROUTE CLEARANCE/FRC—Used by pilots to request that the entire route of flight be read verbatim in an ATC clearance. Such request should be made to preclude receiving an ATC clearance based on the original filed flight plan when a filed IFR flight plan has been revised by the pilot, company, or operations prior to departure.

RESCUE COORDINATION CENTER/RCC— A search and rescue (SAR) facility equipped and manned to coordinate and control SAR operations in an area designated by the SAR plan. The U.S. Coast Guard and the U.S. Air Force have responsibility for the operation of RCCs.

ICAO—RESCUE CO-ORDINATION CENTRE—A unit responsible for promoting efficient organization of search and rescue service and for co-ordinating the conduct of search and rescue region.

RESTRICTED AREA—(See Special Use Airspace)

ICAO—RESTRICTED AREA—Airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions.

RESUME OWN NAVIGATION—Used by ATC to advise a pilot to resume his own navigational responsibility. It is issued after completion of a radar vector or when radar contact is lost while the aircraft is being radar vectored. (See Radar Contact Lost, Radar Service Terminated)

RNAV—(See Area Navigation)

RNAV APPROACH—An instrument approach procedure which relies on aircraft area navigation equipment for navigational guidance. (See Instrument Approach Procedure, Area Navigation)

ROAD RECONNAISSANCE (RC)—Military activity requiring navigation along roads, railroads and rivers. Reconnaissance route/route segments are seldom along a straight line and normally require a lateral route width of 10NM to 30NM and altitude range of 500 feet to 10,000 feet AGL.

ROGER—I have received all of your last transmission. It should not be used to answer a question requiring a yes or no answer. (See Affirmative, Negative)

ROLLOUT RVR—(See Visibility)

ROUTE—A defined path, consisting of one or more courses in a horizontal plane, which aircraft traverse over the surface of the earth. (See Airway, Jet Route, Published Route, Unpublished Route)

ROUTE SEGMENT—As used in Air Traffic Control, a part of a route that can be defined by two navigational fixes, two NAVAIDs, or a fix and a NAVAID. (See Fix, Route)

ICAO—ROUTE SEGMENT—A portion of a route to be flown, as defined by two consecutive significant points specified in a flight plan.

RUNWAY—A defined rectangular area, on a land airport prepared for the landing and takeoff run of aircraft along its length. Runways are normally numbered in relation to their magnetic direction rounded off to the nearest 10 degrees, e.g., Runway 01, Runway 25. (See Parallel Runways)

ICAO—RUNWAY A defined rectangular area, on a land aerodrome prepared for the landing and takeoff run of aircraft along its length.

RUNWAY CENTERLINE LIGHTING—(See Airport Lighting)

RUNWAY CONDITION READING/RCR—Numerical decelerometer readings relayed by air traffic controllers at USAF and certain civil bases for use by the pilot in determining runway braking action. These readings are routinely relayed only to USAF and Air National Guard Aircraft. (See Braking Action)

RUNWAY END IDENTIFIER LIGHTS—(See Airport Lighting)

RUNWAY GRADIENT—The average slope, measured in percent, between two ends or points on a runway. Runway gradient is depicted on Government aerodrome sketches when total runway gradient exceeds 0.3%

RUNWAY IN USE/ACTIVE RUNWAY/DUTY RUNWAY—Any runway or runways currently being used for takeoff or landing. When multiple runways are used, they are all considered active runways.

RUNWAY LIGHTS—(See Airport Lighting)

→**RUNWAY MARKINGS**—(See Airport Marking Aids)

RUNWAY PROFILE DESCENT—An instrument flight rules (IFR) air traffic control arrival procedure to a runway published for pilot use in graphic and/or textual form and may be associated with a STAR. Runway Profile Descents provide routing, and may depict crossing altitudes, speed restrictions, and headings to be flown from the en route structure to the point where the pilot will receive clearance for and execute an instrument approach procedure. A Runway Profile Descent may apply to more than one runway if so stated on the chart. (Refer to AIM)

RUNWAY USE PROGRAM—Action initiated by the airport proprietor, with assistance from the users and FAA, to reduce the effect of noise on residents surrounding an airport through the use of specific runways when wind, weather, and other safety related factors permit.

RUNWAY VISIBILITY VALUE—(See Visibility)

RUNWAY VISUAL RANGE—(See Visibility)

SINGLE-PILOTED AIRCRAFT–

A military turbojet aircraft possessing one set of flight controls; tandem cockpits or two sets of flight controls but operated by one pilot is considered single-piloted by ATC when determining the appropriate air traffic service to be applied. (See Single Frequency Approach)

SLASH–A radar beacon reply displayed as an elongated target.

SLOW TAXI–To taxi a float plane at low power or low RPM.

SPEAK SLOWER–Used in verbal communications as a request to reduce speech rate.

SPECIAL EMERGENCY–A condition of air piracy, or other hostile act by a person(s) aboard an aircraft, which threatens the safety of the aircraft or its passengers.

SPECIAL IFR–(See Fixed-Wing Special IFR)

SPECIAL INSTRUMENT APPROACH PROCEDURE–(See Instrument Approach Procedure)

SPECIAL USE AIRSPACE–Airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities.

TYPES OF SPECIAL USE AIRSPACE:

1. Alert Area–Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft. Alert Areas are depicted on aeronautical charts for the information of nonparticipating pilots. All activities within an Alert Area are conducted in accordance with Federal Aviation Regulations and pilots of participating aircraft as well as pilots transiting the area are equally responsible for collision avoidance.
2. Controlled Firing Area–Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons and property on the ground.
3. Military Operations Area (MOA)–An MOA is an airspace assignment of defined vertical and lateral dimensions established outside positive control areas to separate/segregate certain military activities from IFR traffic and to identify for VFR traffic where these activities are conducted. (Refer to AIM)
4. Prohibited Area–Designated airspace within which the flight of aircraft is prohibited. (Refer to En Route Charts, AIM)
5. Restricted Area–Airspace designated under FAR Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use, and IFR/VFR operations in the area may be authorized by the controlling ATC facility when it is not being utilized by the using agency. Restricted areas are depicted on en route charts. Where joint use is authorized, the name of the ATC controlling facility is also shown. (Refer to FAR Part 73, AIM)
6. Warning Area–Airspace which may contain hazards to nonparticipating aircraft in international airspace.

SPECIAL VFR CONDITIONS–Weather conditions in a control zone which are less than basic VFR and in which some aircraft are permitted flight under Visual Flight Rules. (See Special VFR Operations) (Refer to FAR Part 91)

SPECIAL VFR OPERATIONS–Aircraft operating in accordance with clearances within control zones in weather conditions less than the basic VFR weather minima. Such operations must be requested by the pilot and approved by ATC. (See Special VFR Conditions)

ICAO–SPECIAL VFR FLIGHT–A controlled VFR flight authorized by air traffic control to operate within a control zone under meteorological conditions below the visual meteorological conditions.

SPEED–(See Airspeed, Groundspeed)

→**SPEED ADJUSTMENT**–An ATC procedure used to request pilots to adjust aircraft speed to a specific value for the purpose of providing desired spacing. Speed adjustments are expected to maintain a speed of plus or minus 10 knots or 0.02 mach number of the specified speed.

Examples of Speed Adjustments are:

1. "Increase/reduce speed to mach point (number)."
2. "Increase/reduce speed to (speed in knots)," or "Increase/reduce speed (number of knots) knots."
3. "If practical, reduce speed to (speed);" or "If practical, reduce speed (number of) knots."

SPEED BRAKES/DIVE BRAKES–Moveable aerodynamic devices on aircraft that reduce airspeed during descent and landing.

SQUAWK (Mode, Code, Function)–Activate specific modes/codes/functions on the aircraft transponder, e.g., "Squawk three/alpha, two one zero five, low." (See Transponder)

STAGE I/II/III SERVICE—(See Terminal Radar Program)

STANDARD INSTRUMENT APPROACH PROCEDURE—(See Instrument Approach Procedure)

STANDARD INSTRUMENT DEPARTURE/SID—A preplanned instrument flight rule (IFR) air traffic control departure procedure printed for pilot use in graphic and/or textual form. SIDs provide transition from the terminal to the appropriate en route structure. (See IFR Takeoff Minimums and Departure Procedures) (Refer to AIM)

STANDARD RATE TURN—A turn of three degrees per second.

STANDARD TERMINAL ARRIVAL/STAR—A preplanned instrument flight rule (IFR) air traffic control arrival procedure published for pilot use in graphic and/or textual form. STARs provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area.

STAND BY—Means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. Also means to wait as in "stand by for clearance." If a delay is lengthy, the caller should reestablish contact.

STATIONARY RESERVATIONS—Altitude reservations which encompass activities in a fixed area. Stationary reservations may include activities such as special test of weapons systems or equipment, certain U.S. Navy carrier, fleet and anti-submarine operations, rocket, missile and drone operations, and certain aerial refueling or similar operations.

STEPDOWN FIX—A fix permitting additional descent within a segment of an instrument approach procedure by identifying a point at which a controlling obstacle has been safely overflown.

→ **STEP TAXI**—To taxi a float plane at full power or high RPM.

→ **STEP TURN**—A maneuver used to put a float plane in a planing configuration prior to entering an active sea lane for takeoff. The STEP TURN maneuver should only be used upon pilot request.

STEREO ROUTE—A routinely used route of flight established by users and ARTCCs identified by a coded name, e.g., ALPHA 2. These routes minimize flight plan handling and communications.

STOP ALTITUDE SQUAWK—Used by ATC to inform an aircraft to turn-off the automatic altitude reporting feature of its transponder. It is issued when the verbally reported altitude varies 300 feet or more from the automatic altitude report. (See Altitude Readout, Transponder)

STOP AND GO—A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. (See Low Approach, Option Approach)

STOP-OVER FLIGHT PLAN—A flight plan which includes two or more separate en route flight segments with a stopover at one or more intermediate airports.

STOP SQUAWK (Mode or Code)—Used by ATC to tell the pilot to turn specified functions of the aircraft transponder off. (See Stop Altitude Squawk, Transponder)

STOP STREAM/BURST/BUZZER—Used by ATC to request a pilot to suspend electronic countermeasure activity. (See Jamming)

STOPWAY—An area beyond the takeoff runway designated by the airport authorities as able to support an airplane during an aborted takeoff. (Refer to FAR Part 1)

STRAIGHT-IN APPROACH—IFR—An instrument approach wherein final approach is begun without first having executed a procedure turn; not necessarily completed with a straight-in landing or made to straight-in landing minimums. (See Straight-in Landing, Landing Minimums, Straight-in Approach-VFR)

STRAIGHT-IN APPROACH—VFR—Entry into the traffic pattern by interception of the extended runway centerline (final approach course) without executing any other portion of the traffic pattern. (See Traffic Pattern)

STRAIGHT-IN LANDING—A landing made on a runway aligned within 30° of the final approach course following completion of an instrument approach. (See Straight-in Approach-IFR)

STRAIGHT-IN LANDING MINIMUMS/STRAIGHT-IN MINIMUMS—(See Landing Minimums)

SUBSTITUTE ROUTE—A route assigned to pilots when any part of an airway or route is unusable because of NAVAID status. These routes consist of:

1. Substitute routes which are shown on U.S. Government Charts.
2. Routes defined by ATC as specific NAVAID radials or courses.
3. Routes defined by ATC as direct to or between NAVAIDs.

SUNSET AND SUNRISE—The mean solar times of sunset and sunrise as published in the Nautical Almanac, converted to local standard time for the locality concerned. Within Alaska, the end of evening civil twilight and the beginning of morning civil twilight, as defined for each locality.

SURVEILLANCE APPROACH—An instrument approach wherein the air traffic controller issues instructions for pilot compliance based on aircraft position in relation to the final approach course (azimuth) and the distance (range) from the end of the runway as displayed on the controller's radar scape. The controller will provide recommended altitudes on final approach if requested by the pilot. (See PAR Approach) (Refer to AIM)

SYSTEM STRATEGIC NAVIGATION (SN)—Military activity accomplished by navigating along a preplanned route using internal aircraft systems to maintain a desired track. This activity normally requires a lateral route width of 10NM and altitude range of 1,000 feet to 6,000 feet AGL with some route segments that permit terrain following.

TACAN ONLY AIRCRAFT—An aircraft, normally military, possessing TACAN with DME but no VOR navigational system capability. Clearances must specify TACAN or VORTAC fixes and approaches.

TACTICAL AIR NAVIGATION/TACAN—An ultra-high frequency electronic rho-theta air navigation aid which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station. (See VORTAC) (Refer to AIM)

TARGET—The indication shown on a radar display resulting from a primary radar return or a radar beacon reply. (See Radar, Target Symbol)

ICAO—TARGET—In radar:

1. Generally, any discrete object which reflects or retransmits energy back to the radar equipment.
2. Specifically, an object of radar search or surveillance.

TARGET SYMBOL—A computer generated indication shown on a radar display resulting from a primary radar return or a radar beacon reply.

TAXI INTO POSITION AND HOLD—Used by ATC to inform a pilot to taxi onto the departure runway in takeoff position and hold. It is not authorization for takeoff. It is used when takeoff clearance cannot immediately be issued because of traffic or other reasons. (See Hold, Cleared For Takeoff)

TAXI PATTERNS—Patterns established to illustrate the desired flow of ground traffic for the different runways or airport areas available for use.

TERMINAL AREA—A general term used to describe airspace in which approach control service or airport traffic control service is provided.

TERMINAL AREA FACILITY—A facility providing air traffic control service for arriving and departing IFR, VFR, Special VFR, Special IFR aircraft and, on occasion, en route aircraft. (See Approach Control, Tower)

TERMINAL CONTROL AREA—(See Controlled Airspace)

→ **TERMINAL RADAR PROGRAM**—A national program instituted to extend the terminal radar services, provided IFR aircraft, to VFR aircraft. Pilot participation in the program is urged but is not mandatory. The program is divided into two parts and referred to as Stage II and Stage III. The Stage service provided at a particular location is contained in Airport/Facility Directory.

1. Stage I originally comprised two basic radar services (traffic advisories and limited vectoring to VFR aircraft). These services are provided by all commissioned terminal radar facilities, but the term "Stage I" has been deleted from use.
2. Stage II/Radar Advisory and Sequencing for VFR Aircraft—Provides, in addition to the basic radar services, vectoring and sequencing on a full-time basis to arriving VFR aircraft. The purpose is to adjust the flow of arriving IFR and VFR aircraft into the traffic pattern in a safe and orderly manner and to provide traffic advisory to departing VFR aircraft.
3. Stage III/Radar Sequencing and Separation Service for VFR Aircraft—Provides, in addition to the basic radar services and Stage II, separation between all participating VFR aircraft. The purpose is to provide separation between all participating VFR aircraft and all IFR aircraft operating within the airspace defined as a Terminal Radar Service Area (TRSA) or Terminal Control Area (TCA). (See Controlled Airspace, Terminal Radar Service Area) (Refer to AIM, Airport/Facility Directory, and Graphic Notices and Supplemental Data)

TERMINAL RADAR SERVICE AREA/TRSA—Airspace surrounding designated airports wherein ATC provides radar vectoring, sequencing, and separation on a fulltime basis for all IFR and participating VFR aircraft. Service provided in a TRSA is called Stage III Service. AIM contains an explanation of TRSA. Graphics depicting TRSA layout and communications frequencies are shown in Graphic Notices and Supplemental Data. Pilot participation is urged but is not mandatory. (See Terminal Radar Program) (Refer to AIM, Airport/ Facility Directory, and Graphic Notices and Supplemental Data)

TERRAIN FOLLOWING/TF—The flight of a military aircraft maintaining a constant AGL altitude above the terrain or the highest obstruction. The altitude of the aircraft will constantly change with the varying terrain and/or obstruction.

TETRAHEDRON—A device normally located on uncontrolled airports and used as a landing direction indicator. The small end of a tetrahedron points in the direction of landing. At controlled airports, the tetrahedron, if installed, should be disregarded because tower instructions supersede the indicator. (See Segmented Circle) (Refer to AIM)

THAT IS CORRECT—The understanding you have is right.

THRESHOLD—The beginning of that portion of the runway usable for landing. (See Airport Lighting, Displaced Threshold)

THRESHOLD CROSSING HEIGHT/TCH—The height of the glide slope above the runway threshold. (See Glide Slope, Threshold)

THRESHOLD LIGHTS—(See Airport Lighting)

TIME GROUP—Four digits representing the hour and minutes from the 24-hour clock. Time group without time zone indicators are understood to be GMT (Greenwich Mean Time), e.g., "0205." A time zone indicator is used to indicate local time, e.g., "0205M." The end and beginning of the day are shown by "2400" and "0000," respectively.

TORCHING—The burning of fuel at the end of an exhaust pipe or stack of a reciprocating aircraft engine, the result of an excessive richness in the fuel air mixture.

TOUCH AND GO/TOUCH AND GO LANDING—An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway.

TOUCHDOWN—

1. The point at which an aircraft first makes contact with the landing surface.
2. Concerning a precision radar approach (PAR), it is the point where the glide path intercepts the landing surface.

ICAO—TOUCHDOWN—The point where the nominal glide path intercepts the runway.

TOUCHDOWN RVR—(See Visibility)

TOUCHDOWN ZONE—The first 3,000 feet of the runway beginning at the threshold. The area is used for determination of Touchdown Zone Elevation in the development of straight-in landing minimums for instrument approaches.

TOUCHDOWN ZONE ELEVATION/TDZE—The highest elevation in the first 3,000 feet of the landing surface. TDZE is indicated on the instrument approach procedure chart when straight-in landing minimums are authorized. (See Touchdown Zone)

TOUCHDOWN ZONE LIGHTING—(See Airport Lighting)

TOWER/AIRPORT TRAFFIC CONTROL TOWER—A terminal facility that uses air/ground radio communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the airport traffic area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or nonradar). (See Airport Traffic Area, Airport Traffic Control Service, Approach Control/Approach Control Facility, Approach Control Service, Movement Area, Tower En Route Control Service/Tower to Tower) (Refer to AIM)

ICAO—AERODROME CONTROL TOWER—A unit established to provide air traffic control service to aerodrome traffic.

TOWER EN ROUTE CONTROL SERVICE/TOWER TO TOWER—The control of IFR en route traffic within delegated airspace between two or more adjacent approach control facilities. This service is designed to expedite traffic and reduce control and pilot communication requirements.

TPX 42—A numeric beacon decoder equipment/system. It is designed to be added to terminal radar systems for beacon decoding. It provides rapid target identification, reinforcement of the primary radar target, and altitude information from Mode C. (See Automated Radar Terminal Systems, Transponder)

TRACK—The actual flight path of an aircraft over the surface of the earth. (See Course, Route, Flight Path)

ICAO—TRACK—The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from north (true, magnetic or grid).

TRAFFIC—

1. A term used by a controller to transfer radar identification of an aircraft to another controller for the purpose of coordinating separation action. Traffic is normally issued (a) in response to a handoff or point out, (b) in anticipation of a handoff or point out, or (c) in conjunction with a request for control of an aircraft.
2. A term used by ATC to refer to one or more aircraft.

TRAFFIC ALERT, ADVISE YOU TURN RIGHT/LEFT HEADING (DEGREES) AND/OR CLIMB/DESCEND TO (ALTITUDE) IMMEDIATELY—(See Safety Advisory)

→ **TRAFFIC ADVISORIES**—Advisories issued to alert a pilot to other known or observed air traffic which may be in such proximity to his aircraft's position or intended route of flight to warrant his attention. Such advisories may be based on:

1. Visual observation from a control tower.
2. Observation of radar identified and nonidentified aircraft targets on an ATC radar display, or
3. Verbal reports from pilots or other facilities.

Controllers use the word "traffic" followed by additional information, if known, to provide such advisories, e.g., "Traffic, 2 o'clock, one zero miles, southbound, fast moving, eight thousand."

Traffic advisory service will be provided to the extent possible depending on higher priority duties of the controller or other limitations, e.g., radar limitations, volume of traffic, frequency congestion, or controller workload. Radar/nonradar traffic advisories do not relieve the pilot of his responsibility to see and avoid other aircraft. Pilots are cautioned that there are many times when the controller is not able to give traffic advisories concerning all traffic in the aircraft's proximity; in other words, when a pilot requests or is receiving traffic advisories, he should not assume that all traffic will be issued. (Refer to AIM, Radar Traffic Information Service)

TRAFFIC INFORMATION—(See Traffic Advisories)

TRAFFIC IN SIGHT—Used by pilots to inform a controller that previously issued traffic is in sight. (See Negative Contact, Traffic Advisories)

TRAFFIC NO LONGER A FACTOR—Indicates that the traffic described in a previously issued traffic advisory is no longer a factor.

TRAFFIC PATTERN—The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach.

1. Upwind Leg—A flight path parallel to the landing runway in the direction of landing.
2. Crosswind Leg—A flight path at right angles to the landing runway off its upwind end.
3. Downwind Leg—A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg.
4. Base Leg—A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline.
5. Final Approach—A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. An aircraft making a straight-in approach VFR is also considered to be on final approach.

(See Straight-In Approach-VFR, Taxi Patterns) (Refer to AIM, FAR Part 91)

ICAO—AERODROME TRAFFIC CIRCUIT—The specified path to be flown by aircraft operating in the vicinity of an aerodrome.

TRANSCRIBED WEATHER BROADCAST/TWEB—A continuous recording of meteorological and aeronautical information that is broadcast on L/MF and VOR facilities for pilots. (Refer to AIM)

TRANSFER OF CONTROL—That action whereby the responsibility for the separation of an aircraft is transferred from one controller to another.

ICAO—TRANSFER OF CONTROL—Transfer of responsibility for providing air traffic control service.

TRANSFERRING CONTROLLER/FACILITY— A controller/facility transferring control of an aircraft to another controller/facility.

ICAO—TRANSFERRING UNIT/CONTROLLER—Air Traffic Control Unit/Air Traffic Controller in the process of transferring the responsibility for providing air traffic control service to an aircraft to the next air traffic control unit/air traffic controller along the route of flight.

TRANSITION—

1. The general term that describes the change from one phase of flight or flight condition to another, e.g., transition from en route flight to the approach or transition from instrument flight to visual flight.
2. A published procedure (SID Transition) used to connect the basic SID to one of several en route airways/jet routes, or a published procedure (STAR Transition) used to connect one of several en route airways/jet routes to the basic STAR. (Refer to SID/STAR Charts)

TRANSITION AREA—(See Controlled Airspace)

TRANSMISSOMETER—An apparatus used to determine visibility by measuring the transmission of light through the atmosphere. It is the measurement source for determining runway visual range (RVR) and runway visibility value (RVV). (See Visibility)

TRANSMITTING IN THE BLIND/BLIND TRANSMISSION—A transmission from one station to other stations in circumstances where two-way communication cannot be established, but where it is believed that the called stations may be able to receive the transmission.

TRANSPONDER—The airborne radar beacon receiver/transmitter portion of the Air Traffic Control Radar Beacon System (ATCRBS) which automatically receives radio signals from interrogators on the ground, and selectively replies with a specific reply pulse or pulse group only to those interrogations being received on the mode to which it is set to respond. (See Interrogator) (Refer to AIM)

ICAO—TRANSPONDER—A receiver/transmitter which will generate a reply signal upon proper interrogation; the interrogation and reply being on different frequencies.

TURBOJET AIRCRAFT—An aircraft having a jet engine in which the energy of the jet operates a turbine which in turn operates the air compressor.

TURBOPROP AIRCRAFT—An aircraft having a jet engine in which the energy of the jet operates a turbine which drives the propeller.

T-VOR/TERMINAL-VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION—A very high frequency terminal omnirange station located on or near an airport and used as an approach aid. (See Navigational Aid, VOR)

TWO WAY RADIO COMMUNICATIONS FAILURE—(See Lost Communications)

ULTRAHIGH FREQUENCY/UHF—The frequency band between 300 and 3,000 MHz. The bank of radio frequencies used for military air/ground voice communications. In some instances, this may go as low as 225 MHz and still be referred to as UHF.

UNABLE—Indicates inability to comply with a specific instruction, request, or clearance.

UNCONTROLLED AIRSPACE—Uncontrolled airspace is that portion of the airspace that has not been designated as continental control area, control area, control zone, terminal control area, or transition area and within which ATC has neither the authority nor the responsibility for exercising control over air traffic. (See Controlled Airspace)

UNDER THE HOOD—Indicates that the pilot is using a hood to restrict visibility outside the cockpit while simulating instrument flight. An appropriately rated pilot is required in the other control seat while this operation is being conducted. (Refer to FAR Part 91)

UNICOM—A non-government communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOMs are shown on aeronautical charts and publications. (Refer to AIM, Airport/Facility Directory)

UNPUBLISHED ROUTE—A route for which no minimum altitude is published or charted for pilot use. It may include a direct route between NAVAIDS, a radial, a radar vector, or a final approach course beyond the segments of an instrument approach procedure. (See Published Route, Route)

UPWIND LEG—(See Traffic Pattern)

URGENCY—A condition of being concerned about safety, and of requiring timely but not immediate assistance; a potential Distress condition.

ICAO—URGENCY—A condition concerning the safety of an aircraft or other vehicle, or of person on board or in sight, but which does not require immediate assistance.

VECTOR—A heading issued to an aircraft to provide navigational guidance by radar.

ICAO—RADAR VECTORING—Provision of navigational guidance to aircraft in the form of specific headings, based on the use of radar.

VERIFY—Request confirmation of information, e.g., "verify assigned altitude."

VERIFY SPECIFIC DIRECTION OF TAKEOFF (OR TURNS AFTER TAKEOFF)—Used by ATC to ascertain an aircraft's direction of takeoff and/or direction of turn after takeoff. It is normally used for IFR departures from an airport not having a control tower. When direct communication with the pilot is not possible, the request and information may be relayed through an FSS, dispatcher, or by other means. (See IFR Takeoff Minimums and Departure Procedures)

VERTICAL SEPARATION—Separation established by assignment of different altitudes or flight levels. (See Separation)

ICAO—VERTICAL SEPARATION—Separation between aircraft expressed in units of vertical distance.

VERTICAL TAKEOFF AND LANDING AIRCRAFT/ VTOL AIRCRAFT—Aircraft capable of vertical climbs and/or descents and of using very short runways or small areas for takeoff and landings. These aircraft include, but are not limited to, helicopters. (See Short Takeoff and Landing Aircraft)

VERY HIGH FREQUENCY/VHF—The frequency band between 30 and 300 MHz. Portions of this band, 108 to 118 MHz, are used for certain NAVAIDS; 118 to 136 MHz are used for civil air/ground voice communications. Other frequencies in this band are used for purposes not related to air traffic control.

VERY LOW FREQUENCY/VLF—The frequency band between 3 and 30 kHz.

VFR AIRCRAFT/VFR FLIGHT—An aircraft conducting flight in accordance with visual flight rules. (See Visual Flight Rules)

→**VFR CONDITIONS**—Weather conditions equal to or better than the minimum for flight under visual flight rules. The term may be used as an ATC clearance/instruction only when:

1. An IFR aircraft requests a climb/descent in VFR conditions.
2. The clearance will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA approved noise abatement route or altitude.
3. A pilot has requested a practice instrument approach and is not on an IFR flight plan.

All pilots receiving this authorization must comply with the VFR visibility and distance from cloud criteria in FAR Part 91. Use of the term does not relieve controllers of their responsibility to separate aircraft in TCAs/TRSAs as required by FAA Handbook 7110.65. When used as an ATC clearance/instruction, the term may be abbreviated "VFR;" e.g., "Maintain VFR," "Climb/descend VFR," etc.

→***VFR CONDITIONS ON-TOP/VFR-ON-TOP***—ATC authorization for an IFR aircraft to operate in VFR conditions at any appropriate VFR altitude (as specified in FAR and as restricted by ATC). A pilot receiving this authorization must comply with the VFR visibility, distance from cloud criteria, and the minimum IFR altitudes specified in

FAR Part 91. The use of this term does not relieve controllers of their responsibility to separate aircraft in TCAs/TRSAs as required by FAA Handbook 7110.65.

VFR MILITARY TRAINING ROUTES (VR)—Routes used by the Department of Defense and associated Reserve and Air Guard units for the purpose of conducting low-altitude navigation and tactical training under VFR below 10,000 feet MSL at airspeeds in excess of 250 knots IAS.

VFR NOT RECOMMENDED.—An advisory provided by a flight service station to a pilot during a preflight or in-flight weather briefing that flight under visual flight rules is not recommended. To be given when the current and/or forecasted weather conditions are at or below VFR minimums. It does not abrogate the pilot's authority to make his own decision.

VIDEO MAP—An electronically displayed map on the radar display that may depict data such as airports, heliports, runway centerline extensions, hospital emergency landing areas, NAVAIDS and fixes, reporting points, airway/route centerlines, boundaries, handoff points, special use tracks, obstructions, prominent geographic features, map alignment indicators, range accuracy marks, and minimum vectoring altitudes.

VISIBILITY—The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet, or meters. (Refer to FAR Part 91, AIM)

1. Flight Visibility—The average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night.

   ICAO—Flight Visibility—The visibility forward from the cockpit of an aircraft in flight.

2. Ground Visibility—Prevailing horizontal visibility near the earth's surface as reported by the United States National Weather Service or an accredited observer.

   ICAO—Ground Visibility—The visibility at an aerodrome as reported by an accredited observer.

3. Prevailing Visibility—The greatest horizontal visibility equaled or exceeded throughout at least half the horizon circle which need not necessarily be continuous.

4. Runway Visibility Value/RVV—The visibility determined for a particular runway by a transmissometer. A meter provides a continuous indication of the visibility (reported in miles or fraction of miles) for the runway. RVV is used in lieu of prevailing visibility in determining minimums for a particular runway.

5. Runway Visual Range/RVR—An instrumentally derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end. It is based on the sighting of either high intensity runway lights or on the visual contrast of other targets, whichever yields the greater visual range. RVR, in contrast to prevailing or runway visibility, is based on what a pilot in a moving aircraft should see looking down the runway. RVR is horizontal visual range, not slant visual range. It is based on the measurement of a transmissometer made near the touchdown point of the instrument runway and is reported in hundreds of feet. RVR is used in lieu of RVV and/or prevailing visibility in determining minimums for a particular runway.

   a. Touchdown RVR—The RVR visibility readout values obtained from RVR equipment serving the runway touchdown zone.

   b. Mid-RVR—The RVR readout values obtained from RVR equipment located midfield of the runway.

   c. Rollout RVR—The RVR readout values obtained from RVR equipment located nearest the rollout end of the runway.

   ICAO—Runway Visual Range—The maximum distance in the direction of takeoff or landing at which the runway or the specified lights or markers delineating it can be seen from a position above a specified point on its centerline at a height corresponding to the average eye-level of pilots at touchdown.

VISUAL APPROACH—An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

ICAO—VISUAL APPROACH—An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

VISUAL APPROACH SLOPE INDICATOR—(See Airport Lighting)

VISUAL DESCENT POINT/VDP—A defined point on the final approach course of a nonprecision straight-in approach procedure from which normal descent from the MDA to the runway touchdown point may be commenced, provided the approach threshold of that runway, or approach lights, or other markings identifiable with the approach end of that runway are clearly visible to the pilot.

VISUAL FLIGHT RULES/VFR—Rules that govern the procedures for conducting flight under visual conditions. The term "VFR" is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan. (See Instrument Flight Rules, Instrument Meteorological Conditions) (Refer to FAR Part 91, AIM)

VISUAL HOLDING—The holding of aircraft at selected, prominent, geographical fixes which can be easily recognized from the air. (See Hold, Holding Fixes)

VISUAL METEOROLOGICAL CONDITIONS/VMC—Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima. (See Instrument Flight Rules, Instrument Meteorological Conditions, Visual Flight Rules)

VISUAL SEPARATION—A means employed by ATC to separate aircraft in terminal areas. There are two ways to effect this separation:

1. The tower controller sees the aircraft involved and issues instructions, as necessary, to ensure that the aircraft avoid each other.
2. A pilot sees the other aircraft involved and upon instructions from the controller provides his own separation by maneuvering his aircraft, as necessary, to avoid it. This may involve following another aircraft or keeping it in sight until it is no longer a factor. (See See and Avoid) (Refer to FAR Part 91)

VORTAC/VHF OMNIDIRECTIONAL RANGE/TACTICAL AIR NAVIGATION—A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site. (See Distance Measuring Equipment, Navigational Aid, TACAN, VOR) (Refer to AIM)

VORTICES/WING TIP VORTICES—Circular patterns of air created by the movement of an airfoil through the air when generating lift. As an airfoil moves through the atmosphere in sustained flight, an area of low pressure is created above it. The air flowing from the high pressure area to the low pressure area around and about the tips of the airfoil tends to roll up into two rapidly rotating vortices, conical in shape. These vortices are the most predominant parts of aircraft wake turbulence and their rotational force is dependent upon the wing loading, gross weight, and speed of the generating aircraft. The vortices from medium to heavy aircraft can be of extremely high velocity and hazardous to smaller aircraft. (See Aircraft Classes, Wake Turbulence) (Refer to AIM)

VOR/VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE STATION—A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse code and may have an additional voice identification feature. Voice features may be used by ATC or FSS for transmitting instructions/information to pilots. (See Navigational Aid) (Refer to AIM)

VOT/VOR TEST SIGNAL—A ground facility which emits a test signal to check VOR receiver accuracy. The system is limited to ground use only. (Refer to FAR Part 91, AIM, and Airport/Facility Directory)

WAKE TURBULENCE—Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air. (See Aircraft Classes, Jet Blast, Vortices) (Refer to AIM)

WARNING AREA—(See Special Use Airspace)

WAYPOINT—(See Area Navigation)

WEATHER ADVISORY/INFLIGHT WEATHER ADVISORY—(See AIRMET, SIGMET)

WEATHER ADVISORY/WS/WA—In aviation weather forecast practice, an expression of hazardous weather conditions not predicted in the area forecast as they affect the operation of air traffic and as prepared by the NWS.

WILCO—I have received your message, understand it, and will comply with it.

WIND SHEAR—A change in wind speed and/or wind direction in a short distance resulting in a tearing or shearing effect. It can exist in a horizontal or vertical direction and occasionally in both.

WORDS TWICE—

1. As a request, "Communication is difficult. Please say every phase twice."
2. As information, "Since communications are difficult, every phrase in this message will be spoken twice."

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